THE AMERICAN
JOURNAL OF PHARMACY.

MAY, 1885.

ILLICIUM FLORIDANUM, Ellis.

Natural order, Magnoliaceæ Illicieæ.

By Henry C. C. Maisch, Ph.G.

From an Inaugural Essay.

This species is a shrub or small tree growing in swamps in Florida, Alabama and westward to Mississippi, and is popularly known as Southern star anise, Florida stink bush, or poison bay.

The leaves are about 4 inches long and 1½ inch wide, short petiolate, acuminate, alternate, oblong-lanceolate, entire, smooth, indistinctly pellucid punctate. The midrib is very prominent on the lower side. Flowers are about one inch in diameter; sepals six, green gradually changing to color of petals, deciduous; petals purplish crimson or dark purple, linear, obtuse, in three whorls, the outer having often the color of the sepals; stamens 30 or more, about ⅛ inch long and ⅓ as wide; the anthers consist of two cells adnate, introrse, half the length of the stamen, dehiscence longitudinal; ovaries 13, separate; styles short, erect. In the flowers the carpels are erect, but after fructification they spread horizontally, forming a right angle with the axis. The carpels are capsular, dry, not woody, dehiscent at the ventral suture, and contain each one smooth shining seed about the size of an apple seed.

Griffith (*Med. Botany*, p. 101) said that the bark may be used as a substitute for cascarilla. The leaves are poisonous. The material for this investigation was kindly furnished by Hiland Flowers, Ph.G., of Amite City, La. (now of New Orleans).

HISTOLOGICAL INVESTIGATION.

Root.—The root, on cross-section, shows the bark and the wood to be of about the same thickness and also the entire absence of pith. The cork cells (Figs. 1 and 2) are flattened and tangentially elongated. The bark is composed of large and small thin-walled parenchymatous cells, the small ones being near the cambium and constituting the

inner bark, through which the medullary rays pass. The cells of the rays are larger than the surrounding bast parenchyma, and in the outer liber layer gradually increase in size to that of the cells in the primary or outer bark. The secondary bark contains no bast fibres and is made up of about 12 layers of cells. The primary bark is composed of about 24 layers, the cells increasing in size as they approach the middle. The cambium layer consists of about three rows of minute cells. The wood contains numerous medullary rays, one or two cells wide and from five to twenty cells high in an axial direction. It furthermore contains wood parenchyma, ducts and prosenchyma. The cells of the first are somewhat thickened, are axially elongated and found between the groups of medullary rays. The ducts are thinner-walled and larger than the prosenchyma, and have spiral and scalariform markings, while the prosenchyma cells are quadrangular and are marked by dots and disks.

Stem.—The bark is made up of two distinct layers (Figs. 3 and 4) besides the cork. The cork cells are flattened, closely packed, and elongated in a tangential direction. The primary bark is composed of large, thin-walled cells, which on cross-section are hexagonal and tangentially elongated. The inner layer of the primary bark has two or three interrupted circles of oil cells, the rest being smaller and hexagonal. The outer layer of the primary bark is composed of hexagonal, tangentially elongated and large cells. The secondary bark is composed of a layer of about twenty bast parenchyma cells and twelve cells of the medullary rays, these latter being larger and the secondary deposit relatively thinner than in the former cells, these being axially elongated. The cambium layer is about three cells in thickness. (Figs. 5 and 6.) The wood consists of medullary rays, wood parenchyma, ducts and prosenchyma. The medullary rays, on a cross-section, are seen to be made up of small radially elongated cells, the walls of which are materially thickened by secondary deposit, and which are placed in one or two radial rows, each row containing, in an axial direction, from three to seventeen cells. The wood parenchyma is only found between the perpendicular ends of the medullary rays, consequently in axial lines. (Figs. 7 and 8.) The cells are axially elongated, the cell walls are considerably thickened. The ducts have netted, spiral and scalariform markings (Fig. 9), while the lateral sides of the prosenchyma cells are marked with dots and disks. The pith is composed of hexagonal cells

on a cross-section. The cells are smallest near the wood, and gradually enlarge toward the centre.

Leaf.—The epidermis is composed of a single layer of flattened, thick-walled empty cells. The stomata are very numerous on the lower surface (Fig. 10), while only one was found in a space $\frac{3}{8}$ inch square of the upper surface. They are made up of four cells, two inner and two outer guard cells. (Fig. 11.) On a cross-section, the inner guard cells are seen to bulge into the opening at about half the height of the cells. The outer guard cells are slightly larger and overlap the inner cells at the edges. The rest of the epidermal cells have wavy cell walls. The portion of the leaf between the epidermal layers is made up of loose parenchyma with large air passages and a single palisade layer occupying (Fig. 12) about one-fourth the thickness of the leaf. The midrib is composed of wood fibres, which, on cross-section, appear quadrangular with their cell walls slightly thickened (Fig. 13). This prosenchymatous tissue is arranged in radiating lines and terminates above and below by curves. The concavity, which is toward the upper side of the leaf, is filled by the large-celled spiral ducts, and above this is a single row of bast fibres. On the lower side, the wood is surrounded by a cambium layer and outside of this there are two or three layers of bast fibres. Surrounding this bundle is the loose parenchyma tissue of the leaf, there being three layers of small cells above, and about six to eight layers below, the cells as they approach the epidermis becoming thick-walled. The upper and lower surface of the leaf at this point is covered by a rather thick cuticle.

Capsule —The capsules are composed mainly of parenchymatous tissue, there being only one unbranched fibrovascular bundle in each carpel running through the fleshy portion at the dorsal suture (Figs. 14 and 15). The receptacle for the seed is lined with closely packed elongated thick-walled cells having one end directed toward the seed. The cells near the ventral suture are in three layers (Fig. 16), the outer layer being composed of large parenchyma cells which are elongated in the direction of the style. The other two layers contain axially elongated cells with thickened cell walls, those of the middle layer having the smaller deposit. The outer layer is made up of about four rows of cells and the other two consist of about ten rows together.

Seed.—The seeds are albuminous. The albumen consists of hexagonal cells, seen in the section (Fig. 17), and contain oil. The endo-

pleura consists of one layer of cells, the walls of which are somewhat thickened. The testa consists of two layers, the inner is composed of about three rows of cells with thickened walls (Figs. 17 and 18), and the outer layer is made up of a single row of cells. The cell walls of the outer layer of the testa are very much thickened and extend in a radial direction. The exterior view of the testa shows the cell walls as wavy lines. The external layer of the testa is yellowish, while the interior one is brown.

COLLINSONIA CANADENSIS, LINNÉ.

Natural order, Labiatæ.

BY CHARLES NAPIER LOCHMAN, PH.G.

From an Inaugural Essay.

The thick, hard, knotty rhizome, from which the plant undoubtedly received the names *stone-root* and *knot-root*, grows horizontally but a few inches beneath the surface of the soil and attains a length of about six or eight inches. The plant seems to delight in stony soil, as it is always found in mountainous or very rocky and shady situations. At, and after the time of flowering, the leaves have an agreeable lemon-like odor, due to volatile oil contained in glands on the under-surface. About the time that the fruit is mature, especially if the plant is so situated as to be in the direct sunlight for part of the day, the calices have an odor similar to that of caraway; whether this is due to a volatile oil or a resin I have not been able to ascertain.

Description.—Flowers in racemes, arranged in a terminal panicle. The calices and pedicels covered with stalked glands. Calyx somewhat bilabiate, becoming four-sided and much enlarged in fruit; upper lip with three sharp-pointed teeth, lower with two lanceolate lobes; hairy in the throat. Corolla light yellow, generally purple-veined and hairy on the inside, elongated, widening from the throat outwards; four upper lobes small and obtuse; lower lobe much larger, ligulate and beautifully laciniate fringed. Fertile stamens two (with rudiments of a second pair), exserted, much exceeding the corolla. Style, purple, two cleft at the apex, about the length of the fertile stamens. Ovary deeply four parted, usually ripening only two of the four nutlets. Stem simple, erect, smooth, glaucous, obtusely four angled; from two to five feet high. Leaves thin, smooth, light green above (somewhat darker in the dried state), whitish underneath, ovate, coarsely

serrate, abrupt, or somewhat heart-shaped at the base, taper-pointed; the under surface dotted with small, depressed glands containing volatile oil.

The rhizome is from one to one and a half inches in thickness, four to eight inches long, irregularly branched, the upper surface marked with cup-shaped scars left by the stems of former years; on the lower surface it is covered with long, thin, brown rootlets; it has a thin, brown bark, and a very hard white wood more or less mottled with brown.

Analysis.—The drug was treated with menstrua in the order given in *Dragendorff's Plant Analysis.* One gram of the powdered rhizome and rootlets yielded ·029 gram of ash, after being thoroughly ignited in a porcelain crucible. Fifty grams of the powdered rhizome and rootlets were macerated with 250 cc. of petroleum spirit for one week and the filtered liquid was allowed to evaporate spontaneously, when there was remaining 1·2 gram, or 2·4 per cent. of the weight of the drug employed. On heating this to 110°C. for some time, there was no loss in weight, showing the absence of an appreciable quantity of volatile oil. The residue was of a semi-solid waxy consistence, melting at 40°C., soluble in boiling alcohol, from which it was partly precipitated on cooling, and wholly on the addition of water. This appears to be vegetable wax.

After allowing the petroleum spirit to evaporate from the powder, it was treated with 250 cc. of stronger ether and this liquid allowed to evaporate at the ordinary temperature, when ·3 gram of a somewhat bitter, yellowish, resinous substance was left. On treating this with slightly acidulated water a light yellow liquid was obtained, showing negative results with potassio-mercuric iodide and other tests for alkaloids. Ferric chloride produced a greenish black precipitate which afterwards became inky. A precipitate was also formed on the addition of gelatin. The part remaining after treatment with acidulated water had all the characters of a resin and was almost completely soluble in 95 per cent. alcohol, partly soluble in a solution of potassa, and of a slight bitter taste.

After the ether had evaporated from the powder, it was macerated for eight days with alcohol, and the filtrate made up to 250 cc. Fifty cubic centimeters of this filtrate evaporated left ·59 gram of extract, equal to 5·9 per cent. vegetable matter, neither soluble in petroleum spirit nor ether, but soluble in alcohol. On incinerating this extract

an almost unweighable ash remained, which proved to be principally carbonate of potassium. From the remaining filtrate the alcohol was distilled off and the residue carefully dried over sulphuric acid. The yield was a slightly bitter extract, in which tannin, which turned ferric salts greenish black and precipitated gelatin, was present, but no alkaloid could be found.

The powder remaining from the last operation was then macerated for twenty-four hours with 500 cc. of water, the infusion filtered off, and the dregs washed with sufficient water to bring it up to 500 cc. On evaporating a portion of this liquid it yielded an extract equal in weight to 10 per cent. of the original quantity of the drug employed; 20 cc. of this infusion was mixed with twice its volume of alcohol, when a precipitate was formed weighing ·02 gram. This precipitate dissolved in water did not reduce Fehling's solution until it had been boiled with dilute hydrochloric acid. Its concentrated solution precipitated basic acetate of lead (vegetable mucilage).

A portion of the root on being boiled with water gave, on the addition of a solution of iodine, an intensely blue color (starch).

Leaves.—Ten grams of the powdered leaves were treated in the same manner as the rhizome, excepting a larger proportion of menstruum was used in each case. The petroleum spirit yielded ·3 gram, or 3 per cent. of extract consisting of waxy matter soluble in boiling alcohol, a caoutchouc-like substance soluble in ether, and a trace of volatile oil. The etherial tincture yielded ·44 gram, equal to 4·4 per cent. of extract, which had little taste and odor, and on being triturated with sand and cold water gave a slightly yellowish brown solution, colored greenish black on the addition of ferric chloride. A few drops of acetic acid were then added to the liquid, which, together with the resin, was triturated for a few minutes, allowed to stand for two hours, and filtered. This liquid did not show any indication of an alkaloid upon the application of the various tests. The alcoholic tincture yielded ·47 gram of a dark green extract containing tannin and chlorophyll, but no trace of an alkaloid.

About 16 lbs. of fresh leaves, collected when the plant was in full blossom, were distilled, yielding one drachm of a very light yellow volatile oil of a pleasant lemon-like odor.

From the foregoing meagre experiments the rhizome is shown to contain a resin soluble in ether and partly soluble in alcohol, vegetable wax, tannin, mucilage and starch; and the leaves resin, chlorophyll,

tannin, wax and volatile oil. The volatile oil is nearly all dissipated on drying, at least after several months. It seems almost impossible that this nearly tasteless rhizome should have the wonderful properties ascribed to it by certain eclectic physicians. If any part of the plant is of any use medicinally, I would judge it to be the fresh leaves.

MATERIA MEDICA OF THE NEW MEXICAN PHARMACOPŒIA.

By the Editor.

The "Sociedad Farmaceutica de Mexico," published a national pharmacopœia in 1874, and a second revised edition of this work appeared last year in the Spanish language under the title of "Nueva Farmacopea Mexicana de la Sociedad Farmaceutica de Mexico," the revision having been entrusted to a permanent commission consisting of Professors Alfonso Herrera, Francisco Gonzalez, Jose M. Laso de la Vega, Severiano Perez and Dr. Manuel S. Soriano.

It is a handsome octavo volume, the first 32 pages of which are occupied with a historical introduction and an explanation of the arrangement of the work. Then follow 16 pages of preliminary matter, containing various tables, the most important of which for our purpose are the tables of weights and measures. All pharmaceutical preparations being made by weight, a comparison of the medicinal weights will serve to show the great difference between the values attached to the same signs used in prescriptions in Mexico and in the United States.

Mexican weights.			United States weights.		
℔ i = ℥ xvi	= gr. 9216	= gm. 460·24	℔ i = ℥ xii	= gr. 5760	= gm. 373·24
℥ i = ʒ viii	= gr. 576	= gm. 28·76	℥ i = ʒ viii	= gr. 480	= gm. 31·10
ʒ i = ℈ iii	= gr. 72	= gm. 3·60	ʒ i = ℈ iii	= gr. 60	= gm. 3·89
℈ i	= gr. 24	= gm. 1·20	℈ i	= gr. 20	= gm. 1·30
	gr. i	= gm. 0·05		gr. i	= gm. 0·065

The Mexican measure of capacity, the *cuartillo*, is nearly 4 per cent. smaller than the American pint, the former being 456·00 cc., the latter 473·18 cc. The cuartillo, like the American pint, is subdivided into 16 fluidounces (onzas medidas), the American fluidounce (29·57 cc.) being about 1 cc. larger than the Mexican onza medida (28·50 cc.); the latter is further subdivided into 8 fluidrachms, and these into 3 fluid scruples.

The second part treats, upon 94 pages, upon the crude drugs derived from the vegetable, animal and mineral kingdoms; and this is followed by the pharmacopœia proper (Farmacopea propriamente dicha), which is divided into two parts, the chemical products (112 pages) and the pharmaceutical preparations (96 pages), with 3 pages of supplement and appendix. The index alone covers 72 pages, and is divided into six separate parts, the Spanish, French, English, Mexican (and several other idioms) and Latin references, and an index of authors mentioned in the work. A lengthy list of typographical corrections, covering more than four pages, completes the book.

The text is printed in rather small but clear types, set closely, and is arranged in double columns in alphabetical order of the Spanish names of the subjects. The natural products (crude drugs) are treated of more or less extensively under the following sub-headings, following the names with the vernacular synonyms, botanical origin and natural order: habitat, part used or mode of preparation, physical characters, varieties, chemical composition, adulterations, common and special uses in medicine, therapeutics, the arts or for economic purposes, as well as incompatibles and antidotes. The chemical products and pharmaceutical preparations are treated of in a somewhat similar manner, the process of manufacture being given somewhat in detail.

It will be observed that the Mexican Pharmacopœia partakes in reality more of the character of a dispensatory than of a medical and pharmaceutical law-book. This becomes also evident from the very large number of drugs admitted, some of which are stated to be little used, like brusco (Ruscus aculeatus), opopanax, and others which have become obsolete in most civilized countries. While obviously the materia medica list enumerates a large number of drugs, which are well known here and elsewhere, it is of particular interest for the large number of vegetable products of Mexican origin which have been admitted, and to these we propose to pay special attention in the following brief review.

Abanico, Celosia cristata, *Lin.*, nat. ord. Amarantaceæ, the cockscomb cultivated in our gardens, grows in the Sierra de Huauchinango, and is popularly used in decoction of the leaves as as an antiblennorrhagic.

Abelmosco, Hibiscus Abelmoschus, *Lin.*, nat. ord. Malvaceæ, furnishes the musk seeds of commerce, which are used as a perfume, and in the form of decoction as an emmenagogue and as an antidote to snake bites. The root is used medicinally as an emollient.

Abrojo de tierra caliente, Tribulus terrestris, *Lin.*, nat. ord. Zygophyllaceæ; indigenous to Yucatan. The root and seeds are commonly used for their tonic, stimulant and aperient properties, and a decoction of the leaves and stem, in the form of baths, against articular rheumatism. Taken internally the decoction of the leaves and root has a diuretic action.

Acedera, Rumex Acetosa, *Lin.*, nat. ord. Polygonaceæ, is somewhat employed as a diuretic.

Aceite de Abeto is the turpentine obtained from Pinus religiosa, *Humb. et Bonpl.*, nat. ord. Coniferæ. The tree grows in the mountains surrounding the valley of Mexico and in other parts of the republic. The turpentine is viscous, nearly colorless, ultimately greenish yellow, has a lemon-like odor and a bitter, acrid and aromatic taste, dissolves incompletely in alcohol and mixed with one-tenth of calcined magnesia, acquires in about two days a pilular consistence. It contains volatile oil, extractive and resinoid matter, and abietic and succinic acids. It is procured by puncturing by means of a little tube the vesicles in which it is secreted in the bark. Ocote turpentine from Pinus Teocote, *Schlechtendal*, is frequently substituted for it, but differs materially in its physical properties.

Acíbar, aloes. Socotrine, hepatic (also called opaque socotrine), Cape and Barbadoes or Jamaica aloes are recognized. Socotrine aloes is stated to be superior to the other varieties, but Cape aloes is mostly employed in Mexico. Several species of aloe growing in Mexico might probably be used for obtaining this drug.

Acónito, Aconitum Napellus, *Lin.*, nat. ord. Ranunculaceæ. According to Oliva this plant grows in the sierra between Mazatlan and Durango; the variety *delphinoides* has been described by De Candolle as being peculiar to Central America. The leaves are the only part employed in Mexico.

Acxoyatic, Ipomœa muricata, *Kunth*, nat. ord. Convolvulaceæ, grows on the hills of Tacubaya and other places of the valley of Mexico. The root is rich in resin and is employed as a purgative.

Achicoria dulce, Sonchus oleraceus and S. ciliatus, *Lin.*, nat. ord. Compositæ; abundant near the City of Mexico. The root is commonly used as a tonic, and the leaves for their emollient and galactagogue properties.

Achiotillo, Bixa Orellana, *Lin.*, nat, ord. Bixaceæ, grows in hot localities. The leaves are popularly used as a purgative, and the seeds

as an antidote to Manihot æsculifolia, *Pohl.* From the seeds the dye stuff annato, *achiote*, is prepared, which is regarded as an antidysenteric. But the plant and its products are rarely used by physicians.

Adormideras, Papaver somniferum, *Lin.*, nat. ord. Papaveraceæ; the capsules are used.

Agallas de Lavante, nutgalls. Under the name of *borregos de encina* the lanuginous galls of the evergreen Mexican oaks are popularly used as hæmostatics; they are produced by the sting of Cynips Quercus baccarum.

Agarico blanco, white agaric; used as a drastic and against profuse sweating of consumptives.

Agarico yesca, spunk; used surgically. Boletus igniarius is stated to be more commonly used in Mexico than B. fomentarius.

Agrimonia Eupatoria, *Lin.*, nat. ord. Rosaceæ; our agrimony, grows also in Mexico. It is used as a mild astringent in the form of infusion or decoction in the proportion of 20 : 1000.

Aguacate, Persea gratissima, *Gærtner*, nat. ord. Lauraceæ, grows in the temperate and warm regions of Mexico, producing the varieties vulgaris, oblongo, microphylla and Schiedeana. The pulp of the fruit was found by Betancourt to contain various fats, chlorophyll, malic and acetic acids, various salts, glucose, gum and starch. The seeds contain yellow volatile oil, mannit, green bitter resin, starch, little tannin, fat, gum, etc. Betancourt found also amygdalin and synaptase, yielding hydrocyanic acid, and in the epicarp soft acid resin, aromatic principle, tannin, etc. The leaves and fruit have the reputation of being emmenagogue, and according to Hernandez, are believed by the vulgar to increase the spermatic secretion and to be useful in suppurating wounds and sores. A decoction of the leaves like the powdered bark is employed as an antiperiodic. The pericarp enjoys considerable reputation as a vermifuge in the dose of Gm. 8 to 10, taken fresh, or Gm. 4 to 6 in the dry state; this property probably resides in the resin. The mesocarp is edible and the juice of the seed is used as an indelible ink for clothes. The fruit is known in the West Indies as *alligator pear.*

Other species indigenous to Mexico are Persea drymifolia, *Schiede*, known as *aguacate olorosa*, P. amplexicaulis, *Sch.*, P. pachipoda, *Ehrenb.*, known as *aguacate cimarron*, P. Ligue, *Sch.*, and P. butyracea, *Sch.*, known as *pagua.*

Aguamiel, the juice of different species and varieties of Agave is yellowish or whitish, mucilaginous, frothy, acidulous and sweet, of an

herbaceous odor and a density varying between 1·025 and 1·046. Rio de la Loza found in it sugar 9·55, gum and albumen 0·54, salts 0·73 per cent., the remainder being water, some resinous and albuminous matters, etc. Boussingault found 2·65 levulose, 6·17 sugar, 0·35 malic acid, etc. The juice is used for the manufacture of sugar and of a tolerably good vinegar; its reputed medicinal properties are antiscorbutic and antiblennorrhagic.

LIQUOR IPECACUANHÆ ET MORPHINÆ.—DOVER'S SOLUTION.

By Edwin H. Hess, Ph.G.

From an Inaugural Essay.

Preparation.—Take of acetate of morphine, one dram, diluted acetic acid, one fluidounce, diluted alcohol seven fluidounces, wine of ipecac, two fluidounces. Dissolve the acetate of morphine in the acid, add the diluted alcohol and wine of ipecac, and mix the whole thoroughly. Set aside for twenty-four hours, then filter through paper.

This preparation is not generally known, although used quite extensively where it has been introduced. It originated with Dr. J. D. Coleman of Juliustown, near Mount Holly, Burlington county, N. J., and afterward of Trenton, N. J., now deceased. The preparation is used in only a few other places, as far as I can ascertain, but judging from its popularity in those places, it certainly deserves a much wider scope for usefulness. In Trenton, where I became acquainted with it, it may be gotten from any pharmacist (and is always kept in stock), is prescribed by almost all the physicians, and has a local reputation among the people as a remedy for all ills common to mankind, probably as great as paregoric.

It is transparent, of a yellowish or amber color, due to the coloring matter of the ipecac and the wine. At first the odor is decidedly vinous, but at the same time acetous. It changes rapidly, however, becoming more agreeable, and then somewhat resembles the odor of whiskey, and doubtless contains some of the same or allied ethers. It has very little taste other than the persistent bitter of the morphine; three ounces by measure, should weigh exactly 2¾ ounces, troy, making its specific gravity ·9654. Its color is very little affected by sunlight and refracted light. It has an acid reaction with test paper. It enters into the composition of a preparation known as

Red Drops, viz: Tinctura catechu composita, ℥v; spiritus camphoræ, ℥i; liquor Doveri, ℥ii. This is quite an efficient remedy for diarrhœa, dysentery, cholera morbus, and all summer complaints in general. Locally, it has acquired no mean reputation among the physicians and others, and is thought by some to be equally as good, if not superior, to the renowned Asiatic cholera mixture, Squibb's compound solution of opium, and other preparations of wide-spread reputation.

In addition to the Dover's powder, a new preparation, known as tincture of ipecac and opium was made official in 1880. The solution of acetate of morphia (B. P.) is somewhat similar in its anodyne properties to the Dover's solution, and contains the acetate of morphine in acid solution of the strength of ½ gr. to the drachm. Dover's syrup is a preparation manufactured in Philadelphia, containing syrup as a menstruum, which makes it quite palatable. Syrup, however, is apt to prove disadvantageous on account of its nauseating effects. Nearly all the preparations of this type have this effect, from the fact that they are compounds of opium and not morphine.

The medical properties accorded to the "solution" are, diuretic, diaphoretic, analgesic and sedative. It is quite efficient in the treatment of coughs, colds, etc., and in the first stages of acute inflammations attending throat and lung troubles. It is also very useful in the treatment of rheumatism, neuralgia, etc.

A fluidounce evaporated to pilular consistance, should not weigh more than 7½ gr. (·486 gms.) In attempting to scale the residue by the usual method I was not successful on account of its extreme deliquescence. The resulting mass, however, remains stable for several months, and may be conveniently rolled into pills. From several experiments I found it to be quite as effective in this form as in solution, and being quite heavy (dose ½ grain), the pellets are very easy to take. The solution, on standing, without having been filtered, deposited a dark colored sediment, light in weight. On testing this for morphine none was found. A full grown cat was given different doses (of both liquid and solid form of the preparations), ranging from ⅛ gr. to 2 gr., with the effect of producing sleep. Larger doses produced emesis with general exhaustion, but no alarming symptoms. From these experiments I concluded that it is almost a harmless preparation, as an overdose is almost certain to produce emesis.

GLEANINGS FROM FOREIGN JOURNALS.

By J. Robert Moechel.

Eucalyptol, from Eucalyptus globulus, according to C. Jahns, has the formula, $C_{10}H_{18}O$, boils between 176–177°C., has the spec. grav. ·923 at 16°C., is without optic action, and is identical with cajuputol, as it shows the same chemical and physical properties. He corroborates the observation of Faust and Homayer (1874), that the eucalyptol of Cloëz was a mixture, and shows that Eucalyptolum purissimum of commerce is merely rectified oil of eucalyptus.—*Arch. d. Pharm.*, January, 1885.

Determination of the Value of Pepsin.—O. Schlickum recommends for this purpose the conversion of albumen into peptone. An egg is placed in boiling water for five minutes, and rapidly cooled by cold water; the albumen will be hard, the yolk semi-liquid. Cut the albumen into very fine pieces, and rub through a fine sieve; of this albumen put 10 Gm. into a solution of 0·1 pepsin in 150 water, add 2·5 HCl and keep the mixture at a temperature of 40°C. by means of a water bath. On being dissolved, the albumen is trasformed first into hemialbumose, and afterward into peptone. Digest for 12 hours, then filter, and to 10 cc. of the filtrate add, drop by drop, 1 cc. HNO_3, which should not cause more than a slight opalescence.—*Ph. Ztg.*, No. 16, 1885.

Quantitative Determination of Aloes.—According to H. Hager, aloes is soluble in a cold solution of carbonate of sodium, easily soluble in a 2 per cent. solution of ammonia, entirely so in 80 per cent. alcohol, incompletely in 90 per cent. and absolute alcohol, insoluble in a mixture of 1 vol. of absolute alcohol, 2 vol. of chloroform, and 3 vol. of benzol. To determine aloes in a liquid, evaporate, dry and powder; exhaust at a temperature of 18° to 25°C. with the mixture of alcohol, chloroform and benzol, to separate all the resinous substances soluble in that mixture, and dry the residue; digest this with 80 per cent. alcohol at a temperature near 50°C., frequently shaking; place the resulting solution in a weighed capsule, evaporate and dry. For each gram of the residue use 12 to 15 cc. of a 2 per cent. solution of ammonia, to dissolve the aloes; treat the resulting solution with a very slight excess of a solution of acetate of lead, and restore a slight ammoniacal smell by adding a few drops of ammonia water. Following these directions, the aloes is entirely precipitated as a lead compound. Col-

lect this precipitate, wash with a little distilled water and dry in a warm place. 1 Gm. aloes giving about 2·35 Gm. of the lead compound, multiply the weight of the latter by 0·4256; the result gives approximately the amount of aloes.

To determine the aloes, as such, mix the lead compound with an equal weight of sulphate of ammonium, moisten with water on a shallow plate, kept in a warm place; repeat moistening and drying, to get rid of the ammonia, and extract the dry mass with warm 80 per cent. alcohol; the residue yielded from the latter solution, increased by 12 per cent., gives the amount of aloes of the original mixture.—*Phar. Centralh.*, No. 12, 1885.

Mondamin is the meal of Indian corn deprived of oil.—*Ph. Centralh.*, No. 10, 1885.

Tasteless quinine tannate, containing a maximum quantity of the alkaloid. Mr. Peltz ("Ph. Ztg. f. Russland," 1885, p. 80) recommends the use of a solution (1:30) of hydrochlorate of quinine (in place of the sulphate), which is added to a solution of tannic acid previously neutralized with ammonia. After 24 hours the precipitate is collected, washed, and dried at a temperature not exceeding 30°C. The tannate thus obtained is a pale yellowish white amorphous powder, containing at least 20 per cent. of quinine, is soluble in 400 parts of cold water, in 50 parts of hot water, in 48 parts of cold alcohol, and in 3 parts of hot alcohol.

Vincetoxin.—Ch. Tanret, in an investigation of Vincetoxicum officinale, found two modifications of vincetoxin, a glucoside of the formula $C_{16}H_{12}O_6$, one soluble, the other insoluble, in water. The coarse powder, mixed with some slaked lime, is exhausted with water, the solution saturated with chloride of sodium, the precipitate washed with salted water, dried, shaken with chloroform, decolorized with charcoal, the liquid distilled, and the residue dissolved in an equal weight of alcohol. Now add ether, for precipitation, then half of the entire volume of water, and shake. Evaporate the watery solution, which yields the soluble modification. To the etherial solution add water rendered slightly alkaline, which separates a resinous acid; shake with diluted H_2SO_4, neutralize, distil, and dry the residue at 100°C., when the second modification is obtained.—*Rép. Pharm. Chimie*, No. 3, 1885.

The following formulas have been selected from a number contributed by Eug. Dieterich to "Phar. Centralhalle," 1885:

Acetum Carbolisatum (Carbolic Vinegar).—Mix 5 carbolic acid, 5 Cologne water and 90 diluted acetic acid. Keep in a cool place for several days and filter.

Acetum Fumale Excelsius (Fumigating Vinegar).—Mix 400 Gm. tincture of benzoin, 400 alcohol, 50 acetic ether, 50 essence of jessamine, 100 acetic acid, 10 drops of attar of rose, and 5 drops each of oil of neroli and oil of wintergreen. Keep in a cool place for several days; then filter.

Acetum Stomaticum.—200 compound tincture of spilanthes, 200 spirit of cochlearia (scurvy grass), 100 aromatic tincture, 50 acetic ether, 30 glacial acetic acid, 20 salicylic acid, 400 distilled water, 5 cochineal, 1 oil of sage, 1 oil of peppermint. Mix, warm in a water-bath to 60–70°C.; then keep in a cool place and filter. This vinegar is used as a mouth wash after meals, for which purpose a teaspoonful of it is diluted with about 8 ounces (¼ liter) of water.

Acetum Camphoratum (Camphorated Vinegar).—Dissolve 1 camphor in 19 alcohol; mix with 80 dilute acetic acid. Keep in a cool place for several days and filter.

Acidum Aceticum Aromaticum Excelsius.—Mix 50 oil of bergamot, 50 oil of lemon, 9 oil of ylang-ylang, 1 oil of wintergreen and 89 glacial acetic acid. Keep in a cool place for several days; then filter. It may be colored with eosine or cochineal.

Acidum Aceticum Carbolisatum.—Mix 10 carbolic acid cryst., 85 acetic acid and 5 oil of eucalyptus. For fumigating the sick chamber, drop upon a hot plate.

Æther Cantharidini.—Dissolve 2 Gm. each of cantharidin and extract of cannabis in 996 ether. It is more effectual than cantharidal ether.

Æther Phosphoratus.—Melt 5 phosphorus in 5 glycerin; add gradually 10 pulverized charcoal; mix well, then add 1,000 ether. Shake for half an hour; repeat this four or five times during the day, and lastly filter, adding sufficient ether to make 1,000 parts of filtrate.

Bismuthum peptonatum, a new preparation introduced by E. Merk; it is a soluble powder, and is said to contain in 100 parts 3·1 of Bi, or 3·5 of oxide of bismuth.—*Ph. Centralhalle*, p. 134, 1885.

Koussinate of Sodium.—Pavesi recommends the following process: Mix the powdered kousso with lime, exhaust with alcohol and then with boiling water; mix, recover the alcohol, precipitate the koussin with an excess of concentrated acetic acid, wash, dry the precipitate, and decolorize by dissolving in boiling alcohol and treating with ani-

mal charcoal. Put a portion of the koussin in a capsule containing very hot water, and add crystallized carbonate of sodium until complete solution has been effected. Boil for a few minutes with animal charcoal, filter, and evaporate at a moderate heat. The sodium koussinate is an amorphous, pulverulent mass, of a yellowish white color, little hygroscopic, soluble in cold and more so in warm water and alcohol.—*Journ. de Pharm. d'Alsace-Lorraine*, No. 3, 1885.

Cocaine is recommended as an antidote to morphine.—*D. Med. Ztg.*, p. 25, 1885.

Ground pepper, according to Chr. Neuss, is readily examined for adulterations by pouring upon it concentrated HCl, which imparts a yellow color to all the pepper particles except the black shell. From a rather coarse powder the foreign particles may be readily separated and weighed.—*Ph. Ztg.*

Ground cloves, adulterated with the powdered bark of sassafras, has been observed by Bernbeck.—*Ph. Ztg.*

Paraffinum iodatum has been recommended in place of tincture of iodine. Paraffin oil dissolves iodine with a splendid deep violet color; the strength of the solution is stated by C. Jehn to be 5 per cent.; a 10 per cent. solution cannot be effected, except by dissolving the iodine in absolute ether and diluting with paraffin oil to the strength desired. —*Arch. Pharm*; *Chemiker Ztg.*, No. 16, 1885.

The "Phar. Centralhalle" states that 5 per cent. of iodine cannot be dissolved with the aid of slight heat in paraffin oil from different sources, and that the solution resulting at a higher temperature deposits iodine, leaving about 3½ per cent. of it dissolved in the cold paraffin oil.

Bromine for bleaching sponges has been recommended. Dissolve bromine in 30 parts of water; place the sponges in this solution until they have acquired the desired color; then wash with water acidulated with HCl, and lastly with clean water.—*Journ. de Pharm. d'Anvers*, January, 1885.

Antidote to Iodoform.—M. Behring recommends a 5 or 10 per cent. solution of bicarbonate of sodium.—*Journ. de Pharmacologie; Journ. de Ph. d'Alsace-Lorraine*, No. 2, 1885.

Detection of Iodine after Taking Iodoform.—According to Dr. O. Schweissinger, the iodine cannot be completely separated as iodide of palladium, in consequence of the formation of organic combinations. The same observation has been made by Prof. E. Harnack.

Acidulate the urine with HCl, precipitate with palladious chloride; the following day collect the precipitate on a filter, wash, mix with soda and heat to redness; extract with hot water, filter, wash, acidulate the filtrate, and precipitate again with palladious chloride; collect the precipitate on a filter, wash, dry and weigh. The resulting palladious iodide contains the iodine present as iodide.

For determining all the iodine, measure a cerain quantity of urine; add soda, evaporate to dryness, heat to redness, extract repeatedly with hot water, filter, acidulate, and precipitate with palladious chloride; weigh, and calculate the iodine. Harnack found in this way 0·5277 iodine in 1 liter of which but 0·1072 was present as iodide, while nearly $\frac{4}{5}$ of the iodine was in combination, and could be estimated only after ignition.—*Ph. Ztg.*, No. 20, 1885.

Dental Mastich.—Dissolve 4 mastich and 2·5 balsam of Peru in 7 chloroform.—*L'Union Pharm.*, February, 1885.

A formula in "Phar. Zeitg." recommends 2 mastich, 2 balsam of Peru, and 7 Gm. chloroform.

Vinum iodatum is a preparation highly praised by M. H. Barnouvin. Any wine of but small percentage of tannin may be employed. The proportions are 0·4 to 0·5 Gm. iodine, dissolved in a small quantity of alcohol, and wine *q. s.* to make 1 liter.—*L'Union Pharm.*, February, 1885.

Corn Cure.—Oleum phosphoratum is recommended as excellent to be applied every morning on the place of the stocking touching the corn.

To Distinguish Fresh from Old Ergot.—Koster recommends macerating for some time 2 Gm. of the powder with 5 cc. ether. The resulting solution will be colorless if the ergot is fresh, but yellowish if old.—*Arch. d. Pharm.*

Bernbeck, in "Phar. Ztg.," remarks that this solution should be neutral, and that the oil of old ergot is rancid, therefore giving a more or less acid reaction.

Aqua Picis.—In the place of pine wood saw dust, previously recommended (see "Amer. Jour. Phar.," 1877, p. 350) for dividing (pulverizing) the tar, A. Simon uses the residue of powdered cinchona bark left from the preparation of the tincture, etc. The resulting tar water is slightly bitter from traces of alkaloids, the solution of which is flavored by the acids of the tar. The tar powder thus obtained may

be put into packages, and does not stain the paper.—*Rép. Pharm. Chimie*, No. 3, 1885.

Test for Oil of Rose.—O. Helm, in "Archiv Pharm.," 1885, p. 104, observes that the test with a mixture of 5 p. chloroform and 20 p. alcohol cannot be relied upon, as no separation of crystalline scales took place in four different rose oils which were doubtless genuine. But Prof. Flückiger ("Archiv," p. 185) states that in an experience of many years it has never failed in his hands.

Russian Leather.—Skins tanned with willow bark, and dried, are rubbed with a woollen cloth moistened with birch tar; a solution of alum is applied, then a solution of potassium carbonate and Brazil wood to give the desired color, and lastly the leather is rubbed with fish oil.—*Phar. Ztg.*, No. 18, 1885.

To Prevent Label-moulding in Cellars, etc.—Dissolve borax in the water used to make the paste.—*Ph. Handelsblatt*, No. 5, 1885.

Porcelain-like Label.—Mix thoroughly 1 part of oxide of zinc and 10 parts of solution of silicate of sodium. Put on the bottle three or four coatings, and letter with coal tar diluted with some oil of turpentine.—*Rép. Pharm. Chimie*, No. 3, 1885.

Gelatina Glycerini (Glycerin Jelly).—Mix in a mortar 140 Castile soap and 210 glycerin; add, gradually, 1,680 expressed oil of almond (in cold weather only 1,260 will be necessary), and scent with 4 oil of thyme, 8 oil of bergamot and 2 oil of rose.—*L'Union Pharm; Ph. Ztg.*, No. 21, 1885.

Abrus precatorius.—The poisonous spikes, or "sui," which are used in the Punjab for poisoning cattle, according to Boverton Redwood, are prepared as follows: The shell of the seed is removed, the seed softened in water and pounded into a paste, which is then rolled out into little cylinders, about ¾ inch long, sharpened at one end. After careful drying, the cylinders are further sharpened by being rubbed on a brick, and are finally soaked in animal fat. The suis are fitted, for use, into a wooden handle, from which the point just protrudes. Upon a blow being struck with this weapon, the point of the sui penetrates the flesh, the sui being withdrawn from the handle, into which it is loosely fitted, and remaining in the wound. Death ensues on an average in 48 hours.—*Phar. Jour. and Trans.*, Dec. 20, 1884, p. 483.

TINCTURE DEPOSITS.[1]

By R. A. Cripps.

In November, 1883, I had the honor of reading before the "School of Pharmacy Students' Association" a report upon "Tincture Deposits," by which I mean that sediment which is formed in a tincture after filtration. (See "Amer. Jour. Phar.," 1884, p. 101.)

That report included notices of the following tinctures: Tinct. calumbæ, cardam. comp., chloroformi comp., cinchonæ comp., cinchonæ flavæ, ferri acetatis, gentianæ comp., ipecac., lobeliæ inf. æther., quiniæ and rhei, and it was there shown that the deposits in most of these are of little importance; the two cinchona tinctures and that of acetate of iron being exceptions to the rule.

I now purpose to continue that report, giving the results obtained with a few more deposits received since that time.

Tinctura Digitalis.—The deposit from this tincture is of a pale greyish-green color and small in amount. It was first washed slightly with proof spirit, then digested for a short time with dilute acetic acid, and the solution filtered. The filtrate was only slightly colored, it was shaken twice with chloroform, the chloroformic solution removed by a separatory funnel and evaporated slowly to dryness. The residue was then tested for digitalin by the following method: A few drops of strong sulphuric acid were added to the contents of the dish, and the vapor of bromine applied, a slight violet coloration was produced showing the presence of a small amount of digitalin; but it was very small indeed, quite insufficient for estimation, perhaps 5 per cent. of the whole deposit, which from 1 gallon of the tincture weighed barely 20 grains.

Tinctura Ferri Acetatis.—Another sample of this deposit having been sent to me I estimated the amount of ferric oxide it contained; this amounted to 76·44 per cent., showing that the deposit varies in composition, the former sample giving 69·77 per cent. It was similar in appearance to the last, and the quantity obtained from 1 pint was 33 grains.

Tinctura Lobeliæ Ætherea.—This deposit was similar in appearance to that previously examined, and like it contained no lobeline, but

[1] Read at a meeting of the "School of Pharmacy Students' Association." February 5, 1885.

proved to be a fatty body. It is no doubt formed by the slow evaporation of the ether rendering the fat less soluble. Another sample occurred in crystals, but was of the same nature in other respects.

Tinctura Nucis Vomicæ.—The deposit in this case was very suspicious, being white and in feathery crystals. It was carefully washed with rectified spirit, and the following tests applied:

1st. Sulphuric acid and bichromate of potash. No reaction for strychnia, only reduction of chromate.

2d. Nitric acid. Only faint yellow color.

3d. Sulphuric acid and gentle heat, an orange-red color, but scarcely like the loganin reaction of Messrs. Dunstan and Short.

4th. Boiling with dilute sulphuric acid, and action upon Fehling. None.

These results being negative, I proceeded to dry some, and in doing so noticed that it melted and gave a greasy stain to paper; this, together with the production of soap with caustic potash, proved it to be nothing but fat. Its melting point was found to be 117° F. From ½ gallon of tincture only about 5 grains were obtained.

Tinctura Opii.—This deposit was very small indeed, and appeared as little whitish warty masses on the sides of the bottle. They proved to contain neither morphia nor meconic acid.

I have also received some few deposits which, from the very uncertain nature of their active principles, I have been unable to examine; they are tinct. cascarillæ, from Messrs. Thresh and Wright, and tinct. cuspariæ and sennæ, from Mr. Want, of Blackheath. I desire to thank these gentlemen and also others who have sent me these deposits. The remaining tinctures of the Pharmacopœia either deposit so slightly as to be unimportant and to make the examination of them a waste of time, or the drugs are themselves so little known that any examination is impossible.[1]

From the results I have obtained we see that the tinctures of the British Pharmacopœia remain practically of the same strength for any reasonable time after preparation; that is, in so far as one may judge from the nature of their deposits, although of course changes may occur in the clear liquid by which the amount of active principle may be either raised or lessened, but this is not probable. It may be said

[1] I have since received a large deposit from Mr. J. O. Braithwaite which occurred in tinct. hyoscyami, the examination of which will shortly be published.

on this account that the present tinctures are a satisfactory series of preparations, and if made from drugs of good quality leave nothing to be desired in point of uniformity. But this is a great mistake, for a drug of good quality in one year may be very much stronger than a similar one in the year following, and even in the same year drugs may vary considerably in power and yet be very similar in physical characters. These statements are borne out by the results of Messrs. Braithwaite and Hogg in the case of cinchona, and by Messrs. Dunstan and Short in the case of nux vomica. These instances are especially selected because those experimenters worked upon the tinctures themselves; but much more might be added if we took the results of experiments upon the drugs. Mr. Hogg found in tincture of cinchona from 0·25 per cent. to 0·58 per cent. of total alkaloids, while Mr. Braithwaite's results showed a variation from 0·279 to 0·49 per cent. of total alkaloids, and from 0·070 to 0·345 per cent. of ether-soluble alkaloids. Messrs. Dunstan and Short have shown that tincture of nux vomica is equally liable to variation. Of twelve samples which they examined the total alkaloids varied from ·124 to ·360 per cent., while the strychnia ranged from ·046 to ·131 per cent.

From these figures, and they might be multiplied almost indefinitely, one draws the very natural conclusion that a series of tinctures standardized to a given percentage of active ingredient is a most desirable addition to pharmacy. But one is here met with the difficulty of determining what constituent of the drug shall be considered the active principle. The alkaloids or glucosides are no doubt by far the most potent constituents, but still they do not fully represent the drug, or there would be no need to use Pharmaceutical preparations at all. There must therefore be some other constituent which modifies the action of the alkaloid, and in most cases this is either unknown or extremely difficult of estimation. This is where analysis fails, and upon this Mr. Schacht has based an argument against standardization. Our present knowledge of drugs, he says, is not sufficiently accurate to justify us in bringing forward such preparations.

But, I ask, are we always to wait till our knowledge is absolutely perfect before we apply it to practical uses? I am afraid that if this were done we should never see the results of any scientific work. Besides, it is a general law of nature that things grow by use; if the child did not use his early power of moving his legs, would he ever learn to walk? If the mind were allowed to run riot and its powers

of thought left uncultivated, where would be our mathematicians, scientists or men of business? So with scientific knowledge. Use what we have for practical purposes and it will increase in the use. To apply it to the present case: by the practical working out of methods of titration a deeper knowledge of the constitution of a plant *must* follow, which will most certainly lead step by step to a thorough knowledge of its more indefinite constituents. The alkaloids alone do not represent the full activity of a plant, but it is fairly well established that a specimen containing 1 per cent. of alkaloid is stronger than one containing only ·75 per cent., and therefore the activity of a drug may be measured by that alkaloid, since the other constituents are present in both cases.

This applies when there is but one alkaloid, but when there are two or more, as in cinchona or nux vomica, the difficulty is greater. In these cases it would perhaps be safest to standardize the most powerful to a definite amount; but the remaining alkaloids should also be kept within safe limits by the wise discrimination of drugs. For example, in the case of nux vomica tincture, ·08 per cent. of strychnia is the average of Messrs. Dunstan and Short's results; but I think the nux vomica should be so chosen as to keep the brucia within the limits of ·10 and ·15 per cent., the highest and lowest of Mr. Short's being ·24 and ·075 per cent. The practical difficulties of dilution, etc., urged by Mr. Schacht against standard extracts, cannot be applied to tinctures, since there can be no objection to a little spirit more or less. Mr. Schacht seems rather to indicate that the medical profession does not call for such preparations. If this be the case I wonder at the use of the alkaloids at all; why do they not confine themselves to the old-fashioned infusions and extracts? The very fact of the immense use of alkaloids shows plainly that if standard tinctures and extracts are placed before the medical profession they will be largely and readily prescribed. One would scarcely expect a prescription to be written for standard tincture of opium, for instance, until some firm has brought out such a preparation; the patient could scarcely wait while the chemist devised a method for estimating it.

In regard to standard extracts which, like the tinctures, shall be constant in strength, I have not yet had sufficient experience to speak very strongly as to their feasibility, but I hope soon to be able to show that a series of them is not only desirable but also possible.—*Pharm. Jour. and Trans.*, March 21, 1885, p. 769.

GLEANINGS IN MATERIA MEDICA.

By the Editor.

A new cotton plant. The account of which we published an abstract on page 116 of our February number, had been communicated by a correspondent residing in one of the Gulf States. From more recent correspondence we have become satisfied that a hybrid, as there described, between the cotton and okra plants has not been produced.

Herniaria glabra, Linné, is recommended by Zeissl in catarrh of the bladder; it is given in the form of infusion, 1 gram being used with the same quantity of Chenopodium ambrosioides, *Linné,* to 1 liter of boiling water. The addition of milk renders the infusion more agreeable.—*Allg. Med. Ztg.*

Herniaria belongs to the order Caryophyllaceæ, tribe Paronychieæ, and grows in sandy fields throughout the greater portion of Europe and Northern Asia. It is inodorous, has a saline, somewhat astringent and slightly bitter taste, and was formerly employed in dropsy, in diseases of the bladder and kidneys, and in hernia; it has long since fallen into disuse.

Conium maculatum, Linné.—Lepage corroborates the observations made by Orfila, that the root of this plant contains very little alkaloid. During the spring and summer of the first year, the quantity of alkaloid was very minute, but in September the root contained a larger proportion than could be obtained from roots of the second year's growth.—*Jour. Phar. Chim,* Jan., 1885, p. 10.

Guaiacum Resin.—J. S. Ward examined three samples of this resin and reported his results to the Liverpool Chemists' Association, at the meeting held Nov. 6 last. Petroleum spirit had no solvent action. Alcohol dissolved 96·22, 92·96 and 87·28 per cent; ether took up 88·89, 89·91 and 84·12 per cent., and water between 3·00 and 4·66 per cent. The alcoholic and etherial extracts were found to be soluble in glacial acetic acid, and in liquor potassæ, but only partly soluble in chloroform and in ammonia. Two samples of the resin yielded ·299 and ·334 per cent. of ash, consisting almost wholly of calcium salts, while the third sample, which had yielded least to alcohol and ether, and most to water, gave 6·55 per cent. of ash.—*Phar. Jour. and Trans.,* Nov. 22d, p. 413.

Rasamalas.—Mr. E. M. Holmes states that the information obtained

from Mr. Jamie seems to confirm Hanbury's statement that this liquid storax is not obtained from the rasamala tree, Liquidambar Altingiana, *De Candolle.* It is imported from Arabia and Persia, and is valued at $30 per picul (133⅓ pounds). It is used for scenting clothes and rampah-rampah (spiceries), and for rubbing over the body, also for swollen testicles. It is mostly sent from Bombay to Java. The black and white rasamalas seem to be identical, the latter being probably colored for the market.—*Phar. Jour. and Trans.*, Dec. 20, 1884, p. 482.

Myroxylon Pereirœ.—The volatile oil distilled from the fruit is described by Mr. E. M. Holmes as being almost colorless and of a sweet odor, recalling the fragrance of a field of beans in blossom. It is slightly altered by exposure to air, the odor approaching that of cedar wood. A solution of the oil in rectified spirit separates a white precipitate. The oil seems well fitted for use in perfumery, as it is not exactly like any known perfume.—*Phar. Jour. and Trans.*, Dec. 20, 1884, p. 483.

Abrus precatorius, Lin.—The structure of the seeds has been described by W. Tichomiroff in a paper read before the Russian Society of Physicians and Naturalists at Odessa. They contain oil and granular albuminoids, but neither aleurone nor starch, and in the parenchyma sometimes crystals of stearic acid or hesperidin. The testa is composed of four layers, viz., (1) Rods, colorless in the red part, but purple-violet in the black spot; (2) Palisade cells, branching and at the lower end folded and of small diameter; (3) Parenchyma, tangentially elongated; (4) Albumen the cells of the inner layer being flattened radially and at length coalescing into a homogeneous pellicle which cannot be decomposed into its separate cells by maceration in chromic acid, and which swells strongly in caustic potash. The hilum has two layers of rods, and the palisade cells are replaced by sclerenchyma. By chloride of iron the presence of tannin can be recognized in the albuminous layer and rods.—*Pharm. Jour. and Trans.*, September 6. 1884.

Terminalia Chebula, Retzius.—The dried immature fruits furnish the Turkish drug "kara kalileh," the black myrobalans of old writers. They are shriveled, black, hard, ⅓ to ¾ inch long, with a shining fracture and very astringent taste. Mr. Dickson states that the drug is a mild tonic laxative, in great repute among the Mecca pilgrims, probably because the hadjis tell them that the Prophet praised its virtues. It should be broken up into a coarse powder and swallowed, has a ligneous bitterish flavor,

and in the dose of a drachm acts as a very mild laxative. The Indian Pharmacopœia mentions the drug as combining mild purgative with carminative and tonic properties.—*Phar. Jour. and Trans.*, Dec. 20, 1884, p. 483.

Chinese Rhubarb.—Mr. Wm. Elborne, Assistant Lecturer on Materia Medica, Owens College, states that Chinese or East Indian rhubarb consists of two varieties, of which one possesses the characteristic white lattice-worked venation with a red grained fracture, while the other possesses a longitudinal ramification of white veins with a black grained fracture. The first variety is referred by the author to Rheum palmatum, var. tanguticum, from which plant, the author believes, also the highly esteemed extinct Russian and Turkey varieties were obtained. The second variety is yielded by Rh. officinale, and agrees in all essential characters with the roots from this species cultivated by Rufus Usher, of Bodicote.—*Phar. Jour. and Trans.*, Dec. 20, 1884, p. 497.

Homoquinine and cupreine.—The researches of O. Hesse and of B. H. Paul and A. J. Cownley (see "Amer. Jour. Phar.," 1884, pp. 515 and 575), have been supplemented by others made by the same authors.

O. Hesse (Annalen, vol. 206, p. 240), corroborates the observation of Paul and Cownley that homoquinine on being treated with caustic soda is split into quinine and cupreine, yielding approximately 52 per cent. of the former and 48 per cent. of the latter alkaloid. Cupreine crystallizes from ether in colorless concentrically grouped small prisms, melts at 191° C., dissolves in dilute sulphuric acid without fluorescence and this solution gives with chlorine and excess of ammonia the green color like quinine but less intense. The neutral sulphate crystallizes in delicate prisms sparingly soluble in cold water, and the chlorhydrate forms small needles. The alkaloid combines also with bases, the sodium compound crystallizing in colorless satiny scales. Homoquinine is a compound of the latter class and is obtained by crystallizing from ether a mixture in proper proportion of quinine and cupreine. The composition of the new alkaloid is being investigated by the author.

Paul and Cownley ("Phar. Jour. and Trans.," November 22, 1884, p. 401), obtained from homoquinine 62·37 per cent. of cupreine and 37·63 of quinine, and succeeded likewise in preparing homoquinine synthetically by crystallizing the mixed alkaloids from ether, quinine if used in excess, remaining in solution. A number of salts prepared

by the authors show that cupreine as well as homoquinine must be regarded as distinct alkaloids, and that the characters of the tartrate of the latter may to some extent account for the fact that De Vrij and others came to the conclusion that cuprea bark contains cinchonidine.

Cupreine.	*Homoquinine.*
Sulphate. Solutions easily supersaturated; at the surface the salt separates as minute white specks, which under the magnifying glass show radiating needles.	Much more soluble than the cupreine salt; separates in slender needles, sometimes grouped in stellate bunches and presenting characters closely analogous to those of quinine sulphate.
Acid Sulphate. Much less soluble than the homoquinine salt; the concentrated solution yields distinct tufts of radiating acicular crystals.	By spontaneous evaporation the solution becomes syrupy and then solidifies as a gelatinous slightly fluorescent residue of very small bulk comparatively.
Hydrochlorate. Much loss soluble than the homoquinine salt; distinctly crystallizable in bunches of long glassy needles.	Solution in drying up leaves an amorphous resinoid residue.
Nitrate. Very soluble; distinctly crystallizable in tufts of long stout radiating needles.	Solution dries up to a resinous residue showing no sign of crystallization.
Oxalate. Apparently uncrystallizable, the solution drying up to a resinoid residue, with a few crystalline spots.	Much less soluble than the cupreine salt; delicate needles formed at the surface and becoming opaque on drying.
Tartrate. Much more soluble than the homoquinine salt.	Very sparingly soluble, in many respects resembling cinchonidine tartrate.
Hydriodate. Sparingly soluble in water; distinctly crystallizable without any sign of a resinoid deposit.	Faintly yellow resinoid mass, very similar to that furnished by quinine salts with potassium iodide.
Acid solutions. No fluorescence.	Very marked fluorescence.
Caustic Soda, 10 per cent solution. Very soluble in the cold, and without decomposition.	Decomposed into quinine and cupreine.
Strong alcohol. Less soluble than homoquinine; crystallizes very readily in dense warty groups of minute crystals.	Very soluble; solution dries up almost to an amorphous residue before showing any signs of crystals in minute bunches.
From ether. Crystals more massive than next, arranged in groups and conspicuously striated transversely.	Very thin prismatic laminae, having characteristically shaped ends with two oblique planes.

Sarcocephalus esculentus, Afzelius, s. Cephalina esculenta, *Schumacher*, nat. ord. Cinchonaceæ, grows from Senegambia to the Gaboon, from 16° N. lat. to 5° S. lat., and is known in the Sousou tongue as "doundake," in the Toucouleur as "jadali," in the Bassa country as "dorg," and in Sierra Leone as "amelliky." The root is sometimes

exported from West Africa under the name of *peach root.* Heckell and Schlagdenhauffen consider it valuable as an astringent and febrifuge and as a yellow dye. The bark is sometimes mixed with the bark of Morinda citrifolia, *Lin.*, M. longiflora, *G. Don*, and M. Doundakee, *Heckel*, the latter being regarded by Oliver as a variety of the second species. Doundake bark from Sierra Leone, when young, is grayish, smooth, somewhat fissured, and has small, hard, distant excrescences of a darker color; older bark becomes more blackish, the cracks multiply and the epidermis falls off as a reddish dust; the inner surface is ochrey yellow and striated longitudinally; the liber fibres separate easily in lamellæ; the bark has a bitter taste and tinges the saliva yellow, while the corky layer is astringent only. Doundake bark from Boké (Rio Nunez) differs in the absence of the blackish excrescences, the inner surface is of a darker yellow, the outer layer is less astringent and the liber is more bitter, but the anatomical structure is identical. The authors have not been able to obtain the alkaloidal principle indicated by Bochefontaine, Féris and Marcus, but have found the bitterness to be due to two nitrogenous coloring principles of a resinoid character, differing in their solubility in alcohol and water and having the formulas $C_{28}H_{19}NO_{13}$ and $C_{19}H_{16}NO_9$; the other constituents found are glucose, traces of tannin and a tasteless principle soluble in potassa. The morindas yield a bitter and astringent bark.—*Phar. Jour. and Trans.*, Jan. 31, 1885, p. 614; *Compt. Rend.*, C., 69.

Hedychium spicatum.—Nat. ord. Zingiberaceæ.—The plant is a native of the Himalayas, and the rhizome is known in Hindoostan as *kafur-kachri* or *kapur-kachri*, and is kept dried in slices which are ½ to ¾ inch in diameter and from ¼ to ⅜ inch in thickness. The transverse section is white and starchy and exhibits a large central portion, containing scattered minute vascular bundles, and separated by a faint line from the cortical portion. Externally the pieces are covered with a tough, wrinkled, reddish-brown epidermal layer. The taste is aromatic and slightly pungent The odor may be described as intermediate between storax and rhubarb.

A proximate analysis, made by John C. Thresh, gave the following results: soluble in petroleum ether 5·9, soluble in alcohol (indifferent substance precipitated by tannin, acid resin, etc.) 2·7, glucoside or sugar 1·0, mucilage 2·8, albuminoids and organic acid 1·9, starch 52·3, moisture 13·6, ash 4·6, cellulose, etc., 15·2 per cent.

The benzin extract yielded colorless, inodorous, tabular crystals

which appear to be ethyl-methyl-paracoumaric acid, 2·9 parts of the extract consisted of fat with the odorous principle; a minute portion of this oily liquid dropped upon clothes renders them highly odorous for a considerable length of time, the odor recalling that of hyacinths.—*Phar. Jour. and Trans.*, Nov. 8, 1884, p. 361.

SOME EXPERIMENTS ON STRYCHNINE.

By W. A. Shenstone,

Lecturer on Chemistry in Clifton College.

In 1883 ("Trans.," p. 101), I read a paper before the Society showing that brucine contains two methoxyl groups, and is probably a dimethoxyl derivative of strychnine, as represented by the formula $C_{21}H_{20}(CH_3O)_2N_2O_2$. I have been unavoidably delayed in the further examination of this question, but am now working upon it in conjunction with Mr. A. Richardson.

Meanwhile, my experimental results have been in some degree confirmed by the work of A. Hanssen (*Ber.*, vol. 17, p. 2266), who has obtained methyl chloride and a complementary base from brucine by the use of the same reagent that I employed, viz., hydrochloric acid. Apparently Hanssen was unaware of my experiments, and he has not carried the action so far as I did, nor has he noticed its probable bearing on the relationship between the two alkaloids in nux vomica beans. Since this relation between these bodies occurred to me, I have been much interested in the constitution of strychnine, and, amid many interruptions, have lately made the experiments recorded in this paper. Meanwhile several other chemists have also turned their attention to the subject. Thus, Plugge ("Chem. News," 1883), by oxidizing it with potassium permanganate, has obtained an acid, $C_{11}H_{11}NO_3,H_2O$; Hanriot has re-examined nitrostrychnine; Goldschmidt (*Ber.*, vol. 15, p. 1977) has recognized, qualitatively, indole as a product of the distillation of strychnine with caustic potash; and Scichilone and Magnanimi ("Gazzetta," vol. 12, p. 444) believe that by distillation with zinc-dust they have obtained a new isomeride of the known lutidines from strychnine.

At the end of my last paper, I expressed my intention of working on strychnine in future, as I had reason for thinking it would prove more satisfactory than brucine; and at the subsequent suggestion of

Dr. Armstrong, who I believe some years ago had a similar object in view, I decided to employ its bromo-derivative, as likely to give better results, and in order that at the same time the physiological action of this compound might be examined. This, as a subsequent paper will show, has been done by Dr. Lauder Brunton.

The halogen compounds of strychnine have been already incompletely investigated, Herapath and Tilden having prepared some iodine compounds, and Laurent those of chlorine and bromine.

Laurent observed that when bromine is added to a strong solution of strychnine hydrochloride and the resinous precipitate is filtered off, the solution yields to ammonia a precipitate of bromostrychnine, crystallizing from spirit and forming a crystalline hydrochloride. As I had reason for thinking that nearly all the alkaloid would be precipitated as resin if this method were followed, I attempted, but without success, to prepare bromostrychnine by adding a solution of bromine in chloroform to solution of strychnine in the same solvent. I found, however, that by adding bromine-water to the hydrochloride dissolved in 50 to 100 times its weight of water, no considerable proportion of resin was formed till two equivalent proportions of bromine had been added. From this solution, alkalis threw down a solid, insoluble in water, and crystallizing beautifully from warm alcohol; this evidently corresponded with Laurent's compound. There was no difficulty in completely converting strychnine into this substance.

A portion was crystallized in two fractions. 0·2626 gram of the first fraction gave 0·1188 gram silver bromide, equivalent to 19·23 per cent. of bromine; 0·3070 gram of the second fraction gave 0·1383 gram of AgBr, equivalent to 19·15 of bromine.

Theory for $C_{21}H_{21}BrN_2O_2$ requires 19·37 per cent. bromine.

The platinochloride of this compound is not quite stable; its color slightly changes during drying. A specimen was examined, however, and was found to contain 17·2 per cent. Pt, as against 16·03 required by the above formula.

The crystallography of bromostrychnine is given in a separate note by Mr. H. A. Miers. The crystals are rectangular tables of the rhombic system; $a:b:c = 1·45907:1:1·19457$.

I found bromostrychnine to be fairly soluble in cold, and more so in hot alcohol; also soluble in chloroform. It unites very readily with methyl iodide, the methiodide separating in crystals when methyl iodide is added to an alcoholic solution of monobromostrychnine.

Monobromostrychnine forms a hydrochloride, which, on evaporation, yields gelatinous masses, and these soon set into silky needles.

Having observed that by the addition of four equivalent proportions of bromine to solutions of strychnine practically all the strychnine is thrown down as the resin mentioned by Laurent, I was led to suspect its nature. If precipitated at about 40°, it can be secured easily as a bright yellow powder, which slowly evolves bromine, is insoluble in water and chloroform, but soluble in alcohol. On analysis, 0·1262 gram gave 0·1293 gram of AgBr, equivalent to 43·58 per cent. of Br. It is therefore dibromide of monobromostrychnine, $C_{21}H_{21}BrN_2O_2,Br_2$ (which requires 41·8 per cent. bromine), a little contaminated with some other more highly brominated substance. This was confirmed: 1. By the fact that the same body is thrown down on adding bromine to solution of bromostrychnine. 2. That by the action of ammonia, it is changed to a white substance, having all the properties of bromostrychnine. A specimen of bromostrychnine made in this way was found to contain 21·17 per cent. of bromine, theory requiring 19·37. This is what would be expected from the above facts.

Dibromostrychnine.—When the above precipitate is heated with its mother-liquor for some hours, it presently dissolves. This led me to hope that dibromostrychnine was formed by the reaction $C_{21}H_{21}BrN_2O_2Br_2 = C_{21}H_{20}Br_2N_2O_2,HBr$.

Analyses of the products always show great deficiency of bromine, so there is no doubt that oxidation occurs. Neither did I succeed in effecting the above reaction by heating the dry solid, or by exposing it to sunlight. If, however, solution of bromine in chloroform is added cautiously to a solution of strychnine in the same liquid, there is not much precipitation until two equivalents of bromine have been added. After that, it is rapidly precipitated, probably as a dibromide, analogous to that above described. If the addition of bromine is stopped at the right point, and the solution is treated with alkali, it gives, on evaporation, a resin-like residue, rather easily decomposed by heat; this does not appear to be crystalline. Analysis of a specimen showed it to contain 35·3 per cent. of bromine; so probably it is dibromostrychnine with the formula $C_{21}H_{20}Br_2N_2O_2$, which requires 32·5 per cent. Br, contaminated with some more highly brominated product. Although I have not succeeded in its purification, I hope it will prove useful in some future work.

Chlorostrychnine.—Before proceeding to describe my further experiments with bromostrychnine, I may point out that, although I have not made any experiments on chlorostrychnine, yet the above affords an explanation of the discordant results obtained by Laurent and Pelletier.

The former, by a method analogous to that by which he obtained bromostrychnine, prepared a substance which yielded a crystalline sulphate, and was shown by analysis to be chlorostrychnine, $C_{21}H_{21}ClN_2O$; whilst Pelletier, by completely precipitating a solution of strychnine with chlorine, obtained a compound which contained 24·57 per cent. of chlorine. From the mode of its formation, and from the fact that the formula for dichloride of monochlorostrychnine requires 24·2 per cent. of chlorine, I think there can be no doubt that Pelletier's compound stands in the same relation to Laurent's that the above described dibromide does to Laurent's monobromostrychnine; so that for the present I have not thought it necessary to examine them, although possibly they may be of value in the future progress of this work.

Action of Nitric Acid on Bromostrychnine.—When this compound is heated with excess of strong nitric acid for some hours, copious red fumes are evolved, and the bromine appears to be almost entirely expelled. On concentrating and diluting, a resinous precipitate forms, which consists of the nitrated bodies that have been examined with somewhat varying results by Nicholson and Abel, Claus, Hanriot, and others. The amount of this resin represents a very large proportion of the materials used. The liquid separated from this precipitate was found to have a bright yellow color, and dyed silk. On neutralizing it with potassium carbonate and concentrating, a crop of crystals was obtained which resembled potassium picrate in appearance and solubility; they were explosive. After recrystallization, a portion was examined quantitatively.

0·2386 gram gave 0·0758 gram of K_2SO_4. This is equivalent to 14·2 per cent. of potassium. The picrate requires 14·6 per cent.

The acid itself was isolated by extraction with ether from an acid solution of the salt. The residue, on evaporation, melted at about 120°; it is therefore the 1:2:4:6 trinitrophenol.

On repeating the above treatment with strychnine itself, I got a similar result. When I used ordinary strong nitric acid, I secured 6½ per cent. of picrate; so that allowing for the inevitable loss in working on a small scale, probable the amount was not less than 10 per

cent.; and as I estimate that at least half the strychnine remained in the form of insoluble nitrostrychnines, this may be regarded as representing perhaps nearly 20 per cent. of the material actually acted on. When fuming nitric acid was employed, the yield was rather greater, for 12 per cent. of potassium salt was secured. It was, however, accompanied by another substance which could not be removed except with considerable loss, so that the exact amount of picrate was uncertain.

It is singular that this formation of trinitrophenol in a reaction that has been so frequently studied, should have been overlooked hitherto. It is of considerable interest, for it appears to indicate, in the first place, that strychnine contains a benzene-ring of carbon-atoms, and secondly, that it may perhaps contain one or more hydroxyl-groups; the latter inference is supported by the behavior of strychnine under the action of the alkaline oxidizing agents used. This, if correct, is important, as there are so few cases among the alkaloids in which the manner in which the oxygen is united is known.

I am continuing my experiments on this subject, and hope to be able to carry on the work without interruption in the future, and also to extend my observations to other alkaloids.—*Jour. Chem. Soc.*, March, 1885, pp. 139.

THE ACTIVE PRINCIPLE OF SENNA LEAVES.[1]

By Ralph Stockman, M.B.,

Assistant to Professor of Materia Medica, University of Edinburgh.

Although the literature of the senna plant, as given by Martius,[2] is very extensive, and dates at least from the year 1496, it was not till 1821 that a systematic attempt was made to determine the nature of the active principle, and the other constituents of the leaves. In that year, Lassaigne and Feneulle[3] investigated the subject very fully, and described as the active principle a body which they named cathartin. As their results afterwards became the subject of a good deal of discussion and contradiction, it may be interesting to describe briefly the method by which they obtained cathartin.

[1] Read at a meeting of the North British Branch of the Pharmaceutical Society, February 18.

[2] "Versuch einer Monographie der Sennesblätter," Leipzig, 1857.

[3] *Annales de Chimie et de Physique*, xvi, 1821.

The watery decoction of the leaves was treated with acetate of lead, filtered, the excess of lead in the filtrate removed by sulphuretted hydrogen, and the sulphide of lead got rid of by again filtering. This second filtrate was then evaporated to dryness, and treated with spirit of wine, the alcoholic solution being subsequently evaporated to the consistence of an extract, again treated with spirit of wine containing sulphuric acid (to precipitate the sulphate of potash which is insoluble in alcohol), and filtered. The excess of sulphuric acid was neutralized with acetate of lead, and the excess of the latter removed in its turn with sulphuretted hydrogen. On evaporating the liquid, cathartin was obtained. They describe it as being yellow in color, actively purgative, and give an account of its solubility in various menstrua. They also isolated a body which they thought to be the coloring matter of the leaves. Heerlein,[1] however, found that cathartin prepared as above was quite inert as a purgative, and that the same holds good for the tincture made from the leaves with strong alcohol.

There appeared about the same time several other papers on senna, none of which are of much importance with the exception of one by Bley and Diesel.[2] These chemists obtained a brown extractive body which they considered identical with cathartin, and a yellow resin which they named chrysoretin, on account of its resemblance to chrysophanic acid. They took the chrysoretin in doses up to 30 grains, the brown resin to 60 grains, and the cathartin to 90 grains without causdiarrhœa. They came to the conclusion that the taste, odor and purgative qualities of the drug depend on the combined action of the brown extractive matter and the chrysoretin, and that the inorganic salts and other constituents of the drug are quite inert.

Following this came a series of papers from Buchheim's laboratory. The first of these is by Tundermann,[3] who stated that the active principle is very sparingly extracted by alcohol of 85 per cent. strength, and therefore tried to obtain it by precipitating the watery infusion with strong alcohol. The resulting precipitate when dried formed a brown powder, which was strongly purgative. He states positively that it is not the cathartin of Lassaigne and Feneulle, but thinks that

[1] *Pharmaceutisches Centralblatt*, 1847.
[2] *Archiv der Pharmacie*, Bd. 105.
[3] "Meletemata de Sennæ Foliis," Dorpat, 1856.

the body which is excreted in the urine and which gives the well-known reddish coloration on the addition of an alkali, is identical with the chrysoretin of Bley and Diesel. Sawicky[1] treated the watery infusion of the leaves with acetate of lead, decomposed the precipitate with sulphuretted hydrogen, and then extracted with alcohol, which took up all the active principle. On evaporating the alcohol he obtained a body which readily combined with calcined magnesia—the combination so formed being very purgative. His conclusions are of importance, viz., that the active principle is an organic acid soluble in alcohol, but the salts of which are quite insoluble in that menstruum.

The further investigations, two in number, conducted under Buchheim's direction, call for little mention, except that in one of them the active principle was first named cathartic acid.

In the "Monographie der Sennesblätter" of Martius we find a long account of the botanical sources, etc., of the senna leaves, but only a comparatively short portion of the book is devoted to a consideration of their chemistry. He examined the so-called cathartin carefully, and found it to consist of a mixture of inorganic acids and bases, coloring matter, sugar, etc., and also that it is non-purgative. By digesting the leaves with dilute soda solution, adding sulphuric acid, and allowing the sulphate of soda to crystallize out, he obtained from the crystals, on shaking them up with ether, a yellow body, which he says consists of chrysophanic acid, phæoretin and aporetin (the same bodies as are found in rhubarb). The chrysophanic acid was in such small amount that he had not enough to apply the ordinary chemical tests to, and yet he gives as his opinion that it is the sole active constituent in the leaves. Chrysoretin he found to consist of a volatile oil and coloring matter.

The most valuable contribution to the subject, however, is that of Kubly.[2] He evaporated *in vacuo* the watery infusion of the leaves to the consistence of a syrup, and then, by adding an equal quantity of alcohol, threw down the inorganic salts and mucus. The filtrate was precipitated with large excess of alcohol, the precipitate dissolved in water, and again precipitated with alcohol. This was repeated again and again, hydrochloric acid being finally used to precipitate albu-

[1] "Quædam de Efficaci Foliorum Sennæ," etc., Dorpat, 1857.

[2] *Ueber das wirksame Princip und einige andere Bestandtheile der Sennesblätter*, 1865.

minous substances. He describes the acid as shiny black in color and non-crystalline, insoluble in ether, absolute alcohol and water, but soluble in dilute alcohol. He assigns to it the formula $C_{180}H_{98}O_{82}N_2S$, and shows that it is a glucoside, being easily split up into glucose and a body which he names cathartogenic acid. In addition he gives some experiments to show that it is a colloid and diffuses with great difficulty through animal membranes.

Rau[1] obtained a crystalline body which he named sennin, but Kubly[2] has since shown that it consists simply of sulphur and a bitter stuff.

More lately Bourgoin and Bouchut[3] have stated that in the leaves there are three purgative bodies—chrysophanic acid, cathartic acid and another unnamed substance. They do not appear, however, to have tested the physiological action of the bodies which they separated.

The above is as brief an account as possible of all the literature on the subject which I have been able to find. The results of Kubly are those which are to be found in most of the standard text-books of the present day, but the formula which he has assigned to cathartic acid rouses the suspicion that he was not dealing with a pure body but with a mixture. This idea, coupled with a desire to investigate more fully the action of senna as a purgative, led me to undertake a further investigation of the subject.

In my first attempts to isolate the acid I used as precipitants various salts of lead, lime, copper and soda, but invariably obtained by these methods a substance, which although strongly purgative always contained a considerable amount of nitrogen. Finally, baryta was used, and by its use a pure cathartate may be got. The method which was finally adopted was as follows: The fol. sennæ spiritu extracta were thoroughly moistened with very dilute sulphuric acid in order to set free the cathartic acid from its salts, and then all the matters soluble in cold or hot alcohol were extracted. The alcoholic solution was then precipitated with hot saturated solution of baryta, which was added until it no longer gave a precipitate. The whole was then filtered, the residue well washed, and having been put into a glass vessel a stream of carbonic acid gas was passed through it for some hours.

[1] *American Journal of Pharmacy*, 1866.
[2] *Vierteljahrschrift f. prakt. Pharm.*, Bd. xvii.
[3] *Jahresbericht über die Fortschritte der Chemie*, 1871.

It was again filtered, and as the CO_2 does not decompose all the cathartate of baryta the cathartic acid is found partly free in the filtrate and partly as cathartate of baryta in the residue on the filter. The latter, after treatment with sulphuric acid and filtering, yields a light brown colored filtrate, which was repeatedly shaken up with ether to remove the coloring matter arising from a slight decomposition of the cathartic acid. It was then carefully neutralized with lead carbonate or oxide at a very slightly elevated temperature, filtered, and so much alcohol and ether added to the filtrate that a moderate precipitate occurred. After again filtering, the filtrate was treated with very great excess of alcohol and ether, the resulting precipitate of cathartate of lead collected on a filter, washed with alcohol, and dried *in vacuo* over sulphuric acid. There remains in the alcohol-ether, however, a considerable quantity of cathartic acid, because the neutral cathartate of lead seems during the precipitation to form both a basic and an acid salt, the latter of which is not thrown down.

To obtain the baryta salt, the same method practically is used barium hydrate being substituted for lead. The neutral solution, however, is only very slightly precipitated by alcohol-ether, and hence baryta water must be added to it, thus greatly facilitating the precipitation.

In the filtrate obtained after treating the original barium precipitate with CO_2 there is also a large amount of cathartic acid, which may be recovered by adding acetate of lead, treating the precipitate with sulphuric acid, filtering, and then adding to the filtrate baryta water. The resulting precipitate is then washed and from it either the lead or barium salt obtained as before.

By this method a large quantity of the cathartic acid is undoubtedly lost, unless the various filtrates and precipitates be re-worked, but after trial of many other methods and modifications of this method, I have found that by it the purest specimens of cathartic acid are obtained. The chief points in it are: (1) that the solutions of the active substance must never be evaporated by, or even exposed to heat, as thereby, whether the solution be acid, alkaline or neutral, decomposition is certain to ensue. This was proved by a series of special experiments. And (2) the use of H_2S must be avoided, as it was probably from this that the sulphur in Kubly's acid arose.

The salts have the following characteristics: Cathartate of lead is a non-crystalline, grayish powder. The neutral salt is readily soluble

in water, the basic salt insoluble, or nearly so, and on treatment with water, the former splits into an acid and basic salt. The baryta salt behaves in the same way. When in mass it is almost black in color, but when finely powdered becomes yellowish red. When quite pure neither salt contains either *nitrogen* or *sulphur*, and hence the presence of these bodies in Kubly's cathartic acid must be attributed to impurities. If the salts be decomposed with sulphuric acid and then filtered, a clear brown solution of the free acid is obtained. The test for its purity consists in agitating it with ether, when the latter should remain quite colorless. It is almost tasteless.

Comparatively few experiments were needed to demonstrate the physiological action of cathartic acid.

A solution of the free acid was carefully neutralized with sodium carbonate, and a portion of it given by the mouth to a rabbit. Within an hour very violent diarrhœa occurred, which lasted for two or three hours, at the end of which time the animal died. Smaller doses caused simply violent diarrhœa. The urine in all cases gave a red color on the addition of caustic potash, just as it does when the ordinary pharmacopœial preparations of senna leaves have been administered. *Post-mortem* examinations were made in four cases, when the only changes found were inflammation and hyperæmia of the intestinal mucous membrane.

It has been stated that the senna preparations, when injected directly into the blood, are capable of causing purgation,[1] and to test this a series of experiments was made. I began by giving small doses subcutaneously and by the jugular vein, but, finding them without effect, increased the dose given until it was twice as large as that which had caused violent diarrhœa and death when given by the mouth. In no case did purgation follow the administration. The animal simply appeared out of sorts for the next few days, probably chiefly from the effects of the operation. In all these cases the urine gave the caustic potash reaction, showing that the cathartic acid had become decomposed in the blood.

The investigation of the chemical relationships and decomposition products of cathartic acid offers many difficulties, owing largely to the instability of the bodies with which one has to deal and to the small quantities obtained.

[1] Compare Nasse "Beitr. zur Physiologie der Darmbewegung," Leipzig, 1866; Wood "Treatise on Therapeutics," 3d edit., p. 464.

If the solution of the acid or one of its salts be boiled for a few minutes with a dilute mineral acid, the clear solution becomes turbid and throws down a yellowish brown precipitate mixed with black flecks; these latter collect themselves into a black mass, and finally form the only decomposition product which is insoluble in water. It is the cathartogenic acid of Kubly (also purgative), but contains other bodies as well. In the filtered solution there is present a kind of glucose which reduced Fehling's solution, but could not be got to ferment with yeast. Boiling with caustic potash also decomposes cathartic acid, but the products were not investigated.

The yellowish brown precipitate was next examined. It was separated from the other matters present by agitation with ether, which dissolves it, the yellow ethereal solution being then poured off. On evaporating the ether a light orange-colored resinous-looking body is left behind. It is insoluble in water, but was purified by dissolving it in a small quantity of sodium carbonate solution from which it was precipitated by the addition of hydrochloric acid, the precipitate being collected on a filter, well washed with water and finally dissolved in alcohol. On evaporating the alcohol, a dark brown amorphous body is obtained, which however consists of various constituents. On treating it with ether a portion of it only is dissolved, the solution being of a pure yellow color. This body is also amorphous, and on the addition of an alkali gives a bright cherry-red color, being probably the substance which gives this reaction in the urine. It, however, is also not a simple substance, as it undergoes further changes on being boiled with an acid.

Among the decomposition products of cathartic acid is also found a body which is present in commercial chrysarobin. It is obtained from chrysarobin by treating the latter with ether, whereby a small portion of it is dissolved. The ethereal solution is then washed with very dilute potassium hydrate, and the substance obtained by allowing it to crystallize out from a hot alcohol-chloroform solution. This body is almost identical with chrysarobin, but differs from it in so far as that when dissolved in strong caustic potash and exposed to the air it is not oxidized into chrysophanic acid, and in fact seems to undergo no change whatever.

If this body be oxidized by boiling it with Fehling's solution, and after the addition of HCl the whole be shaken up with ether, a portion of it is dissolved. The ethereal solution is dichroous, being by

direct light of a beautiful emerald green and by reflected light of a fine red color, just as chlorophyll is. Its absorption bands in the spectrum are also very similar to those of chlorophyll. The amount of this coloring matter is very minute, the principal product, after the above treatment with Fehling, being a body of a pure reddish brown color which is insoluble in alkalies, acids and other menstrua, and only very sparingly soluble in boiling chloroform and acetic ether, to which it imparts a violet color. If cathartic acid, after being decomposed by boiling with dilute HCl, be treated in the same way with Fehling, etc., the product gives exactly the same reactions. The reaction could invariably be obtained with chrysarobin, but not with cathartic acid, the explanation probably being that with too little boiling the body is not formed, and with too prolonged boiling it is further decomposed. Nothing definite could be made out as regards its relations to cathartic acid.

From the results given above it may be safely inferred that cathartic acid is a colored glucoside. On boiling with acids a simple decomposition into glucose and the coloring matter does not take place, because at the same time a whole series of intermediate products are formed, the investigation and identification of which would consume a vast amount of time. From the results of a few experiments which were afterwards made it seems probable that the difficulties would be lessened by using KHO instead of HCl to decompose the acid.

An ultimate analysis to determine its formula was not made, because in a free state it is so easily decomposed and therefore difficult to obtain quite pure, and also because it was so difficult to obtain its salts otherwise than as a mixture of the neutral and basic cathartates. All the purgative substances which up to the present time have been separated, either pure or as decomposition products of glucosides from rhubarb, senna and rhamnus—viz., chrysophanic acid, cathartic acid, emodin and many other unnamed bodies—act locally as irritants, and hence as purgatives when introduced into the alimentary canal. A colloid glucoside like cathartic acid has an especially violent action, as it is absorbed with great difficulty, and hence traverses the greater part of the intestines. Its decomposition products act in the same manner.

In conclusion, I have to express my thanks to Professor Schmiedeberg, of Strassburg, for much valuable advice while carrying out this investigation.—*Phar. Jour. and Trans.*, March, 1885, p. 740.

THE ACTIVE PRINCIPLE OF INDIAN HEMP.[1]

By Surgeons Warden and Waddle,

Bengal Medical Service.

One of the most serious drawbacks to the medicinal use of this powerful drug (*Cannabis Indica*) is that we cannot depend upon its preparations being possessed of activity; moreover, the large amount of resin in each dose is often productive of gastric disturbance. These objections would at once be overcome were we able to extract from the resin its active principle.

Since 1839, when Sir W. O'Shaughnessy, of Calcutta, brought the peculiar properties of Indian hemp prominently to the notice of the medical world,[2] several attempts have been made to isolate the active principle of the plant with remarkably conflicting results.

In 1846, Smith[3] separated a resin which he called "cannabin," and which he believed to be the active principle; and said that it possessed much narcotic activity. No subsequent observers, however, have been able to obtain by the process employed by Smith, any body which fully answers to the description of Smith's "cannabin."

In 1857, Personne[4] resolved the volatile oil, obtained by distillation of the plant, with water, into cannabene ($C_{18}H_{20}$), a light hydro-carbon, and a solid crystalline hydride of cannabene ($C_{18}H_{22}$). He states that inhalation of the vapor of cannabene produces a powerful physiological effect, and he claims it as being the sole active principle of Indian hemp.

In 1876, Preobraschensky,[5] operating on "hashish" got from Turkestan, asserted that the active principle was not a resin, but an alkaloidal body, which he recognized as nicotine, the volatile liquid alkaloid of tobacco. It has been suggested that the presence of nicotine might be due to the hemp having been mixed, as it sometimes is in the bazaars, with tobacco, but Preobraschensky states that he obtained this nicotine from the flowering tops of the plants as well as from the commercial resin.

Merck, of Darmstadt, applies the term "cannabin tannin" to a glucoside contained in Indian hemp which he has combined with tannin. This preparation is not possessed of powerful activity, and frequently is inactive. By treating this tannin compound with zinc oxide Herr Bombelon obtained a substance which he named "cannabinum," as a greenish-brown powder not agglutinating upon exposure to the air and volatilizing without residue on platinum foil.[6]

In 1881, Siebold and Bradbury reported to the British Pharmaceutical Conference that Indian hemp does contain a volatile alkaloid which, how-

[1] From the *Indian Medical Gazette*

[2] "On Indian Hemp or Gunjah," Calcutta, 1839; also "Bengal Dispensatory," Calcutta, 1842, pp. 579–601.

[3] *Pharm. Journ.*, vol. vi., p. 171. In Ph. Jour. April 18, 1885, Thos. Smith describes the effects upon himself of his cannabin, and states that it was not a simple principle and after keeping for three years, had become inert.

[4] *Journal de Pharm.*, xxxix., p. 48.

[5] *Pharm. Zeitsch. f. Russland*, p. 705.

[6] *Pharm. Zeit.*, May 10, 1884.

ever, does not possess the characters of nicotine. They called it "cannabinine" and obtained only 2 grains from 10 pounds of hemp. They do not appear to have tested its action physiologically, and so have left it undetermined whether this volatile alkaloid be really the narcotic principle of hemp.

The above chemists thus obtained widely different bodies, yet each individually believed that the substance which he isolated represented the active principle of the drug. With the subject thus involved, and having at hand a supply of fresh and active hemp, we undertook an examination of the plant in the endeavor to isolate its active principle. Since commencing our observations, Dr. Matthew Hay has reported[1] that he has isolated an alkaloid in the form of colorless, needle-like crystals, which, however, did not posses the narcotic properties of the plant, but produced tetanus in frogs in exactly the same manner as strychnine—though not chemically identical with it. Dr. Hay, therefore, called this alkaloid "tetano-cannabin." It must exist in the plant in exceedingly minute traces, for only a few grains were obtained from 1 kilogramme of hemp. He considers it a secondary alkaloid of the plant, and not the chief active principle. We have specially investigated this point as to whether the plant contains an alkaloid with tetanizing properties.

The following is a preliminary note of some of our results: One thousand grams of the flowering tops and leaves of Indian hemp of ascertained activity were roughly powdered and then moistened with 1 litre of a 5 per cent. solution of sulphuric acid and allowed to digest at a temperature of 68°F. This mixture was then packed in a percolator and percolated with about 1 litre of distilled water till the fluid which passed through was colorless.

This fluid, after filtration, measured 1½ litres, and was of a dark sherry color, smelling very strongly of the characteristic odor of the plant. Carbonate of lime was added to neutralize the free acid, and carbonate of soda solution to render it alkaline. On the addition of the soda a copious precipitate fell down. The unfiltered mixture was then well agitated with ether; and this ethereal layer, which ought to contain any alkaloidal body soluble in ether, was afterwards drawn off and allowed to evaporate spontaneously.

The subjacent liquid which remained after removal of the ethereal layer was evaporated on the water-bath to dryness and then boiled with absolute alcohol and filtered, and the filtrate evaporated on the water-bath. This ought to contain Hay's tetano-cannabin, which is freely soluble in alcohol, but sparingly so in ether.

The ethereal layer, yielded on evaporation about half a gram of a yellowish-brown extract which was insoluble in water, but soluble in a weak solution of carbonate of soda. Of this extract 0·25 gram was injected into the stomach of a young cat without the slightest effect.

The alcoholic solution yielded about 3 grams of a dark greenish-brown extract with a very fragrant aromatic odor. The whole of this was rubbed up well with water and carbonate of soda solution (Hay's alkaloid is "easily

[1] *Pharm. Journ.*, 1883, p. 998.

soluble in water"); and frequently shaken up with ether. The ethereal layer was then siphoned off and the ether driven off by evaporation on the water-bath, giving about ·2 of a gram of an amorphous light brown substance, which was soluble in about twenty times its weight of distilled water. This watery solution was neutral in reaction. Half of it was injected hypodermically into the thigh of a cat without any positive result.

It will thus be seen that although operating on so large a quantity of the plant of ascertained activity, we were unable to find any evidence of the existence of such a principle as Dr. Hay describes.

As many of those addicted to the hashish form of intemperance obtain the intoxicating effects by smoking the plant in a pipe, it is to be expected that destructive distillation of the freshly prepared resin might yield up the active principle. This process was, therefore, resorted to. By the destructive distillation of the freshly prepared alcoholic extract of the plant to which an excess of caustic potash solution had been added, an amber colored oil was obtained, which, by exposure to the air or the action of alkalies, rapidly became of a dark reddish-brown color. This oil had a mildly empyreumatic odor which was distinctly tobacco-like. Its taste was warm, aromatic and somewhat terebinthinate. The oil contained phenol, ammonia and several other of the usual products of destructive distillation.

The nicotine-like principle contained in this oil appeared to be alkaloid. It formed salts which evolved a strong nicotine-like odor when acted on by alkalies. But physiologically it was found to be inert, and, therefore, was evidently not identical with nicotine.

The oil as a whole was also found to be devoid of any narcotic or irritant qualities. About one-eighth of an ounce was introduced into the stomach of a cat without producing any sensible effect. These results do not coincide with those of Personne, who asserted that the active principle of the plant resided in the volatile oil. It is just possible that the active principle was decomposed by the high temperature necessary for destructive distillation.

The principle which represents the full activity of the plant has yet to be isolated. If the active principle be a body which is actually distinct from the resin, the fact of its being so intimately associated with the resin renders its separation a matter of peculiar difficulty, for it is remarkably difficult to deal chemically with resinous compounds.—*Phar. Jour. and Trans.*, January 17, 1885, p. 574.

VALUE OF CONVALLARIA MAJALIS.—The glitter of novelty is wearing away, and after two or three years of universal praise we find that Lily of the Valley is exciting some doubts as to its medical value. Leubascher affirms that grains ¼ of convallarin produces paralysis and loss of reflex activity in frogs, and in animals a progressive fall of arterial pressure, with slowing of the pulse and final diastolic arrest of the heart. Pel. Leyden and Stiller agree with Leubascher in finding no therapeutic utility in its employment. Prof. E. T. Bruen, in our own country, says that it can be employed with reasonable confidence in functional cardiac disorders and in mitral obstruction, and that, in comparison with digitalis, it acts more as a cardiac regulator, but much less as a cardiac stimulant.—*Therapeutic Gazette; Pacif. Med. and Surg. Jour.*, April, 1885.

VARIETIES.

LIQUID EXTRACT OF CINCHONA containing 5 per cent. of mixed alkaloids, is now recommended by Professor Redwood to be prepared as follows: One pound avoir. of red cinchona bark in No. 60 powder is exhausted, by digestion and percolation, with ½ fluidounce of hydrochloric acid and distilled water, and the percolate is evaporated below 180° F. to the consistence of a firm extract. If on dissolving 30 grains of this extract in 2 drachms of hot distilled water it gives more than a slight precipitate on cooling, the whole of the extract should be similarly treated and the clear liquid again evaporated to the consistence of a solid extract, the alkaloidal strength of which is to be determined.

The liquid extract is then prepared by taking as much of the solid extract as contains 1 ounce of total alkaloids, adding 5 fluidounces each of glycerin and water, heating over a water-bath until solution is effected, and when cool, adding 5 fluidounces of alcohol and as much water as is required to make the product measure 20 fluidounces.—*Phar. Jour. and Trans.*, December 6, 1884, p. 441.

FLUID EXTRACT OF ERGOT, in doses of 5 to 20 drops 4 or 5 times a day has been found advantageous by Dr. G. L. Magruder, of Washington, in dysentery of children.—*Virg. Med. Monthly.*

ERGOT IN PULMONARY DISEASES.—According to the "London Medical Record," ergot is of advantage in congestions of the lungs, as in pneumonia and acute bronchitis, relieving the hemorrhagic sputa, difficult expectoration, dyspnœa, fever and delirium.—*Pac. Med. and Surg. Jour.*, April, 1885.

QUEBRACHO.—Drs. Huchard and Eloy, of Blois, affirm that the six alkaloids of Quebracho reduce temperature in fevers even more effectually than quinine. Such a result is obtained in typhoid by the hypodermic injection of gr. 1½ to 3 of muriate of aspidospermine.—*Pacific Med. and Surg. Jour.*, April, 1885.

CHLORAL IN ALBUMINURIA.—Dr. Wilson has treated a few cases of albuminuria with this drug, and has noticed that by its constant use he was able to cause a complete disappearance of albumin from the urine, the albumin reappearing as soon as the remedy was suspended. The theory of its action is not stated.—*Am. Med. Digest*, March, 1885; *Brit. Med. Jour.*

ESERINE IN TETANUS.—G. H. Brandt ("Practitioner," October, 1884), reports a cure of traumatic tetanus in an adult from the administration of ¼ of a grain of eserine every hour.—*Pac. Med. and Surg. Jour.*, April, 1885.

OINTMENT OF LEAD NITRATE.—For old ulcers of the leg, Professor Bartholow recommends blistering the surface of the ulcer and the adjoining integument, then putting on a light poultice, and afterwards applying an ointment composed of: ℞. Plumbi nitratis, ʒ i.; vaseline, ℥ i.—*Med. Herald.*

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Micro-Chemistry of Poisons; including their physiological, pathological and legal relations. With an Appendix on the detection and microscopic discrimination of blood. Adapted to the use of the medical jurist, physician and general chemist. By Theodore G. Wormley, M.D., etc., Professor of chemistry and toxicology in the Medical department of the University of Pennsylvania. With 96 illustrations upon steel. Second edition. Philadelphia: J. B. Lippincott Company, 1885. 8vo, pp. 784. Price, in cloth, $7.50.

"This excellent work is a very valuable addition to the literature on the subject of poisons. Each page bears evidence of untiring research, and of a vast amount of labor." With these words we introduced the review of the first edition of this work, in 1867, and we repeat them now, as equally applicable to the new edition now before us. Even a superficial comparison with the former would show that the present volume has been thoroughly revised and brought up to the requirements of the present time. While its scope and design have not been altered, the additions are numerous, the more important being poisoning by potassium chlorate, post-mortem diffusion of arsenic, presence of arsenic in various articles, including glass, Dragendorff's method for the isolation of vegetable poisons, the ptomaines, jervine and gelsemium, with its two characteristic principles, gelsemic acid and gelsemine; finally, the properties, detection and discrimination of blood, which subject is illustrated by eight engravings on steel and a chromo-lithograph of blood spectra. In addition to these, a number of wood-cuts have been added, and ten steel engravings, showing the micro-chemical reactions of jervine and of gelsemium, the total number of illustrations on steel being 96, all of which have been engraved by Mrs. Wormley and her daughter, Mrs. J. Marshall. A table giving the behavior of 15 alkaloids to chemical reagents is also a valuable addition for the comparison of the reactions of these alkaloids and of the observable limits.

The importance of the subject treated, and the care and labor bestowed upon all the details, render the volume a standard work to which those interested may refer with the assurance of finding trustworthy information. The book is handsomely gotten up, and the proof-sheets have been very carefully read, the typographical errors being very few; on page 652 the name of Prof. Ladenburg has been twice rendered Landenburg.

Year-Book of Pharmacy; comprising Abstracts of papers relating to pharmacy, materia medica and chemistry contributed to British and foreign Journals from July 1, 1883, to June 30, 1884; with the Transactions of the British Pharmaceutical Conference at the 21st annual meeting, held at Hastings, August, 1884. London: J. & A. Churchill. 8vo, pp. 628.

Proceedings of the American Pharmaceutical Association at the thirty-second annual meeting, held at Milwaukee, Wis., August, 1884. Philadelphia: published by the American Pharmaceutical Association. 8vo, pp. 623.

The first one of these annual publications reached here early in February. The "Proceedings" have been printed, and will be distributed about the middle of May; with it will be bound the "General Index to vols.

xviii to xxx (1880 to 1882)," covering 174 pages. Accounts of the meetings of both Societies, with brief abstracts of the papers read, will be found in the October number, 1884, of this Journal. The "Year-Book" occupies 326 pages, in addition to which 28 pages give the titles of new publications relating to pharmaceutical subjects. The "Report on the Progress of Pharmacy" embraces 363 pages, or more than one-half of the second volume mentioned above. As usual, the "Year-Book" and the "Report" contain abstracts of most papers of pharmaceutical interest published during the year in Europe or America.

The Proceedings of the following State Pharmaceutical Associations for 1884 have not been previously noticed:

Illinois.—Fifth meeting held at Bloomington, on Sept. 30, 1884. 8vo, pp. 128. Next meeting in Chicago, on first Tuesday (1st day) of September next. T. H. Patterson, Secretary.

Iowa.—Fifth meeting held at Marshalltown, May 27, 1884. 8vo, pp. 160. With phototype of J. H. Harrison, of Davenport, who was President of the Association for 1883–84. Next meeting in Council Bluffs, May 12, 1885. Local Secretary, J. B. Atkins.

Michigan.—Second meeting held at Detroit, Sept. 9, 1884. 8vo, pp. 227. Next meeting in Detroit, Oct. 13, 1885. Local Secretary, A. W. Allen.

Review of the Drug trade of New York for the year 1884. Prepared by D. C. Robbins, Esq., for the 29th annual report of the Chamber of Commerce of the State of New York. 8vo, pp. 12.

During the fiscal year ending June 30, 1884, as compared with the preceding year, the importation of cinchona barks has decreased over one million pounds, while the quinine imported has increased over 200,000 ounces, the amounts being respectively 2,588,307 lbs., and 1,263,732 oz. The importation of opium during the same period has reached 264,746 lbs., an increase over the preceding year of 35,734 lbs. In consequence of the advance in the Customs rate from $6 to $10 per lb., only 1,066 lbs. of opium prepared for smoking was imported, but the importation of the same commodity during the preceding fiscal year was unusually large, having reached 298,153 lbs.

An Introduction to the Study of the compounds of Carbon, or Organic Chemistry. By Ira Remsen, Professor of Chemistry in the Johns Hopkins University. Boston: Ginn, Heath & Co., 1885. 12mo, pp. 364. Price, by mail, $1.30.

As stated on the title-page, this book is intended for beginners, as an introduction to the study of the subject, and it therefore deals not so much with special facts, but rather with the fundamental principles underlying the compounds of this class. These principles are illustrated by special cases, and the general relations are discussed more fully than is usual in elementary works, and in a clear and attractive manner, well calculated for aiding the student in grasping the fundamental laws preparatory to the

study of special subjects or branches. More than eighty experiments are described, illustrating the methods used in preparing the principal classes of compounds, and the fundamental reactions involved in their transformations, thus showing the way to the proper study of this important branch of science.

The book deserves to be widely known among students of pharmacy, medicine and others whose aim is not merely a knowledge of a few isolated facts, but a sound foundation upon which correct knowledge of causes and effects may be based. The book is well printed; the proof-sheets have been carefully read; the equations explaining the reactions are numerous; graphic formulas are judiciously used to a limited extent; a limited number of illustrations showing the arrangement of apparatus in the performance of certain experiments have been added; and nothing of importance appears to have been omitted for accomplishing the objects had in view.

Cocaine hydrochloride as the name of the salt formed by cocaine with hydrochloric acid, and a discussion of the nomenclature of alkaloidal salts in general. New York: Druggists' Circular Press, 1885. 12mo, pp. 97. Price, 50 cents.

A reprint from the "Weekly Drug News" of a number of editorials and communications on the above subject.

The Medical Directory of Philadelphia, Pennsylvania, Delaware, and the Southern half of New Jersey. 1885. Philadelphia: P. Blakiston Son & Co. Pp. 397. Price, $2.50; to subscribers, $2.00.

This is a very complete and very carefully compiled directory, giving, in addition to the names and locations of medical practitioners, also those of pharmacists, druggists, chemists, dentists, veterinarians, and of other vocations more or less directly connected with or depending on the practice of medicine; also national, State and local associations, the Pennsylvania laws relating to medicine, pharmacy and dentistry, hospitals, dispensaries, homes, charitable organizations, etc. This varied information becomes readily accessible by a full table of contents and a complete index, and reference is greatly facilitated by the arrangement of material and types.

The Medical Directory of Chicago, including Cook Co., for 1884–85. Edited by Robert Tilly, M. D. Chicago: W. T. Keener. 12mo, pp. 179. Price $1.25.

The scope of this work applying to Chicago and Cook Co., Ill., is similar to the preceding one, and it contains in a concise form such information as is frequently desired by physicians and pharmacists.

Official Register of Physicians and Midwives now in practice to whom certificates have been issued by the State Board of Health of Illinois, 1877–1884. Chicago: W. T. Keener. 8vo, pp. 324. Price $1.50.

The register is arranged by counties in alphabetical order, reference to the names being had by three indexes, of physicians, midwives and towns. A directory of medical societies of Illinois, a list of revoked certificates for unprofessional and dishonorable conduct, the laws referring to the practice of medicine in Illinois and other matters are contained in this volume.

Index Medicus. Edited by John S. Billings, M.D., and Robert Fletcher, M.D. Published by George S Davis, Detroit.

In former years we have repeatedly called attention to this valuable periodical, the publication of which was undertaken by the late Frederick Leypoldt, New York, and will henceforth be continued by the firm mentioned above. The general plan will remain unaltered, and the same regard as heretofore will be given to typographical accuracy and finish. We learn that thus far the enterprise has not been pecuniarily remunerative; but it is to be hoped that the support from the medical profession will be such as to make the publication self-sustaining; its importance cannot be over-estimated, containing as it does the subjects of all papers relating to medicine, appropriately classified, which are published throughout the civilized world, thus making an invaluable repository of all investigations and observations on the science and practice of medicine in its widest application.

The Elements of Botany; embracing organography, histology, vegetable physiology, systematic botany and economic botany. Arranged for school use or for independent study. Together with a complete glossary of botanical terms. By W. A. Kellerman, Ph.D., Professor of botany and zoology in the Kansas State Agricultural College, etc. Philadelphia: John E. Potter & Co. 12mo, pp. 360. Price, $1.25.

As a work giving the outlines of botany, this publication is a very valuable one, which is admirably calculated to serve as an introduction to the more extended study of botany. Its arrangement is convenient, the descriptions, though necessarily brief, are clear and correct, the illustrations are characteristic, and the selection of the material shows good judgment and discrimination; the book will prove to be of value to students generally and to pharmaceutical students in particular.

The first part treats of organography, the morphological appearance of the different parts of plants. Then follows histology and physiology, in which the cell, the tissues and the conditions of growth are discussed. The third part is devoted to a brief exposition of systematic botany, followed by 80 pages on which an account is given of the more important plants and vegetable products used in medicine, as food and in the arts. The appendix contains valuable suggestions regarding the study of botany, the collection and preservation of plants, the use of the microscope, and a full glossary.

Plant Analysis; a classified list of the wild flowers of the Northern United States, with keys for analysis and identification; to which is added a complete glossary of botanical terms. By W. A. Kellerman, Ph.D., etc. Philadelphia: John E. Potter & Co. 12mo, pp. 253. Price, $1.

This book is intended to aid the beginner in the identification and classification of the wild-growing North American phanerogamous plants growing east of the Mississippi, and from Kentucky northward, with the exception of the grasses, sedges, rushes, and those restricted to alpine or other limited localities. It is divided into two parts, the first of which is devoted to the morphology of the different parts arranged in the order of their importance for classification, viz., flower, fruit, leaf, stem and root, fol-

lowed by practical notes and suggestions, a glossary and a list of abbreviations of authors' names. The second part contains keys to the families, to the genera and to the species, followed by a systematically arranged list of the plants, numbering 1,707 species. The keys are arranged in quite a convenient manner, prominent and opposite characteristics having been selected for the purpose of analysis, and placed in juxtaposition, so as to become more thoroughly impressed on the mind.

Insomnia and other Disorders of Sleep. By Henry A. Lyman, A.M., M.D., Professor of Physiology and of diseases of the nervous system in Rush Medical College, etc. Chicago: W. T. Keener, 1885. Pp. 239. Price $1.50.

The subject is treated of in seven chapters on the nature and cause of sleep, insomnia, remedies, treatment in particular diseases, dreams, somnambulism and artificial somnambulism or hypnotism, the last chapter closing with the consideration of the phenomena of so-called spiritualism, table-rapping, planchette-writing and metaphysical healing.

The reception of the following pamphlets is acknowledged:

Twenty-eighth Annual Report of the Council of the Pharmaceutical Society of Australasia, with which is incorporated the Pharmaceutical Society of Victoria, 1885, with list of members and honorary members. Melbourne. Pp. 16.

The Annual Report of the Pharmacy Board of Victoria. Melbourne, 1885.

Report on the Waters of the Hudson River, together with an analysis of the same, made to the Water Commissioners of the city of Albany. By C. F. Chandler, Ph.D. January, 1885. Pp. 35.

The Filth-power. By J. B. Olcott. From Report of Secretary of Connecnecticut Board of Agriculture, 1885. Pp. 41.

Typhoid Fever and low water in Wells. By Henry B. Baker, M.D., Lansing, Mich. From the annual report of the Mich. State Board of Health, 1885. Pp. 26.

Report of Committee on School Hygiene, in Tennessee. By Dan. F. Wright, M.D., Clarksville. From the second report of the Tennessee State Board of Health, January, 1885. Pp. 51.

Yale College Observatory. Report for the year 1883-84. Horological and Termometric bureaus.

Pennsylvania Hospital. Addresses delivered by Dr. Thos. G. Morton and John B. Garrett on the unveiling of West's picture Christ healing the sick. Eleventh mo. 10th, 1884. Pp. 30.

Sur le sulfo-carbol (acide orthoxyphénylsulfureux), ses propriétés antifermentescibles et antiseptiques. Par M. F. Vigier, Pharmacien.

On sulphocarbol, its antifermentative and antiseptic properties.

International Electrical Exhibition, 1884. Reports of Examiners of Sections xiv-xvi (batteries), xix (electric telegraphs), xxiv (electro-dental apparatus), xxvii (applications of electricity to warfare) and xxx (machinery and mechanical appliances).

The Oleates; further investigation into their nature and action. By John V. Shoemaker, A.M., M.D., etc. From the "British Medical Journal," October 14, 1884.